

THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York.

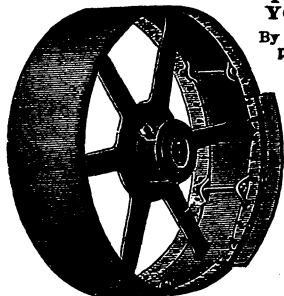
Vol. LIII: No. 15.

New York, Thursday, April 12, 1894.

\$4.50 a Year, including Postage.
Single Copies, Ten Cents.

Reading Matter Contents..... page 720
Classified List of Advertisers.... " 91
Alphabetical Index to Advertisers " 95
Advertising and Subscription Rates " 739

**SAVE YOUR POWER,
YOUR BELTS,
YOUR MONEY**



By covering your pulleys with
SHULTZ Patent Leather Pulley Covering
Send for Circular to
SHULTZ BELTING CO.,

ST. LOUIS, MO.
NEW YORK, N. Y., 225 Pearl St., A. B. Laurence, Mgr.
BOSTON, MASS., 104 Summer St., G. J. Kelley, Mgr.
PHILADELPHIA, PA., 129 N. 3d St., J. Garnett, Mgr.

VALLEY STEEL CO.,

ST. LOUIS
Manufacturers of

STEEL CUT NAILS,

RAILS,

CHANNELS AND MERCHANT STEEL.



Every Steam Plant
Should be provided with
**BRISTOL'S RECORDING
PRESSURE GAUGE.**

Low in Price and Guaranteed.
Send for circulars and fac-simile
chart.

THE BRISTOL CO.,
Waterbury, Conn.

BRAIDED CORD.



Samson and Massachusetts Brands.

Send for Samples.

SAMSON CORDAGE WORKS, Boston, Mass.

TURNBUCKLES.



BRANCH OFFICE: 136 Liberty St., New York.
Cleveland City Forge and Iron Co., Cleveland, O.

Jobbers Carrying a large Stock of the Wilmot & Hobbs Mfg. Co. Celebrated Copperized Oilers.
Russell & Erwin Mfg. Co., NEW YORK.
Sargent & Co., BOSTON.
Green, Tweed & Co., PHILA., PA.
Montgomery & Co., CHICAGO.
The Bigelow & Dowse Co., ST. LOUIS.
Frye, Phipps & Co., CLEVELAND.
The Dana Hardware Co., DETROIT.
Baldwin, Robbins & Co., MILWAUKEE.
Biddle Hardware Co., CINCINNATI.
Horton, Gilmore, McWilliams & Co., LOUISVILLE.
Hibbard, Spencer, Bartlett & Co., INDIANAPOLIS.
Fairbanks, Morse & Co., DES MOINES, IOWA.
Charles H. Besley & Co., SIOUX CITY, IOWA.
A. F. Shapleigh Hardware Co., DUBUQUE, IOWA.
L. M. Rumsey Mfg. Co., KANSAS CITY, MO.
W. M. Buck & Co., OMAHA, NEB.
Cahill, Collins & Co., DENVER, COL.
The Geo. Worthington Co., SAN FRANCISCO, CAL.
McIntosh, Huntington Co., LONDON, ONT.
Fletcher Hardware Co., TORONTO, ONT.
Buhl Sons & Co., HAMILTON, ONT.
John Fritzlauff Hardware Co., MONTREAL, P.Q.
Rundell-Spence Co.,
Howell, Gano & Co.,
Hart Hardware Co.,
W. B. Belknap & Co.,
Layman, Carey & Co.,
Patrick & Luthe Co.,
Knapp & Spaulding Co.,
A. Tredway & Sons Hardware Co.,
Richards & Conover Hardware Co.,
Rector & Wilhelmy Co.,
Hendrie & Bolthoff, Mfg. Co.,
Baker & Hamilton,
Hobbs Hdw. Co.,
Rice, Lewis & Co.,
Aikenhead Hardware Co.,
Wood, Valence & Co.,
Caverhill, Learmont & Co.,
AND MANY OTHER PROMINENT JOBBERS.

**YOU WILL NEVER MISS A BIRD IF YOU USE
U. M. C. PAPER SHELLS.**

"Trap Shells."

TRAP SHELLS (green) are equal to the best imported; have conical base, are water-proofed, have an extra strong metal reinforcement, are METAL REINFORCED, are WARRANTED gas tight and adapted for use with all kinds of nitro-powders. Can be reloaded many times.

"Smokeless Shells."

SMOKELESS SHELLS (salmon color) are the same as the Trap Shell except that they are not metal REINFORCED, being intended for MODERATE charges only of nitro-powders, which should not exceed 3/4 drams (measure) for 12 gauge, or 3/4 drams for 10-gauge.

"Nitro Club."

NITRO CLUB SHELLS are designed to meet the demand for a moderate priced shell adapted to nitro-powders. Quality is the same as our celebrated "New Club" shells, but they have special strong primers (not sold except in these shells) and a new form of base, thereby giving quick ignition and Strong Combustion to moderate charges of nitro-powder.

"New Club."

NEW CLUB SHELLS are designed for use with black powders. Conical base, primed with the celebrated U. M. C. No. 2 primers. All sizes and lengths.

The Union Metallic Cartridge Co., Bridgeport, Conn.

**RANDOLPH & CLOWES,
WATERBURY, CONN.,**

Manufacturers of Seamless Drawn Brass and Copper Tubing and Large Shells, Brazed Tubes and Mouldings, Sheet Brass, Sheet Copper, German Silver.

—SOLE MANUFACTURERS OF—

Brown's Patent Seamless Drawn Copper House Boilers.

CANNOT COLLAPSE. WILL NOT LEAK.

Ordinary weight tested to 200 lbs., extra heavy to 300 lbs. pressure per square inch. Made of two Seamless Drawn Copper Shells. Handsomest, best and strongest and safest boiler in the market and cheapest in the end. Send for circular and instructions to prevent accidents from freezing, &c., &c.



TO THOSE INTERESTED IN OR USING VALVES.

We have recently made improvements in the manufacture of **JENKINS BROS. VALVES** having increased the number of bolts, thickness of flanges, &c.

We shall manufacture one grade of valve only, suitable for high or low pressure steam. The Jenkins Discs used in these valves are suitable for high or low pressure. We guarantee all valves stamped with Trade-Mark.

JENKINS BROS.,

NEW YORK. PHILADELPHIA. BOSTON and CHICAGO

COPPERIZED C. R. SWEDOH, ALSO NICKEL PLATED

FOR THE CONVENIENCE OF
RETAIL HARDWARE and MILL SUPPLY HOUSES

We have arranged with all of the principal
Jobbing Houses in the Country to carry

A Large Stock of our

CELEBRATED OILERS

AND QUOTE THEM AT BOTTOM PRICES.

These Oilers are very durable, substantial and beautiful, and sell at sight. The character of the Jobbing Houses fully vouches for their excellence.



Please send your inquiries and orders to your nearest Jobber and facilitate delivery and lessen transportation expenses.

STEEL ANTI-RUST OILERS & C.

ALL SIZES & STYLES
BURNISHED FINISH
CHEAP & ELEGANT
SCALE 1-12 SIZE

LARGE STOCK, BEST OF GOODS & FACILITIES
THE WILMOT & HOBBS MFG. CO
HOT & COLD ROLLING MILLS AND FACTORIES
BRIDGEPORT, CONN., U. S. A.
STORE, 20 MURRAY ST., NEW YORK.

Rainey Connellsville Furnace and Foundry Coke.

The only Coke you can buy and know you are getting the best that can be manufactured. All our works in the heart of the Region, within four miles of Connellsville, Pa.

CAPACITY 4,000 TONS DAILY.

W. J. RAINEY,

MAIN OFFICE:
Mercantile Bank Building.

CLEVELAND, OHIO.

THE
ANSONIA BRASS
AND **COPPER CO.**
MANUFACTURERS OF
BRASS AND COPPER
Seamless Tubes, Sheets, Rods and Wire.

Ingot Copper.

SOLE MANUFACTURERS

Tobin Bronze
(TRADE-MARK.)

Condenser Plates, Pump Linings, Wire, Round,
Square and Hexagon Bars, for Pump
Piston Rods and Bolt Forgings.

19 & 21 Cliff Street, - - New York.

THE
New Haven Copper Co.,
SOLE MAKERS OF

POLISHED COPPER

Under Patent of T. James, Sept. 12, 1876.

ALSO MANUFACTURERS AND
DEALERS IN

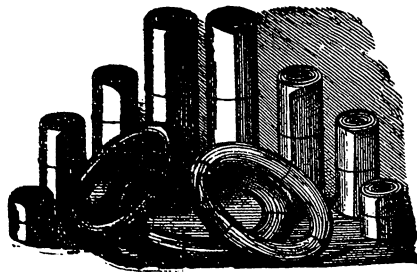
BRAZIERS' & SHEATHING COPPER,

Kettles, Bottoms, Bolts, Circles, &c.,

ALSO MANUFACTURERS OF

Cast Steel Augers and Bits of Superior Quality.

294 Pearl St., NEW YORK.



Waterbury Brass Co.

Established 1845.

Sheet, Roll and Platers' Brass,

German Silver, Copper, Brass and Ger-
man Silver Wire, Brass and
Copper Tubing,

**COPPER RIVETS AND BURS,
PERCUSSION CAPS,
TAPE MEASURES,
METALLIC EYELETS,**

Brass Kettles, Brass Tags, Powder Flasks,
Shot Pouches, &c.,

AND SMALL BRASS WARES OF EVERY DESCRIPTION.
HICK'S PRIMERS. BERDAN PRIMERS.

*Cartridge Metal in Sheets or
Shells a Specialty.*

Sole Agents for the CAPEWELL MFG. CO.'S
Line of Sporting Goods.

DEPOTS:

296 Broadway, New York. 125 Eddy St., Provi-
dence, R. I.

MILLS AT WATERBURY, CONN.

WHEN IN WANT OF
ANYTHING IN

**BRASS
AND
COPPER**

WRITE

ROME BRASS & COPPER CO.,
ROME, N. Y.

THE PLUME & ATWOOD Mfg. Co.

MANUFACTURERS OF

Sheet and Roll Brass

—AND—

WIRE,

GERMAN SILVER AND GILDING METAL,
COPPER RIVETS AND BURS, COP-
PER ELECTRICAL WIRE,

Pins, Brass Butt Hinges, Jack Chain,
Kerosene Burners, Lamp
Trimmings, &c.

18 MURRAY ST., NEW YORK.

71 PEARL ST., BOSTON.

90 MARKET ST., CHICAGO.

ROLLING MILL,
THOMASTON, CONN.

FACTORIES:
WATERBURY, CONN.

SCOVILL MFG. COMPANY,

Manufacturers of

BRASS

Sheet, Wire, Tubes.

**BUTT HINGES,
BUTTONS,
LAMP GOODS,
NOVELTIES,**

PURE ALUMINUM

INGOT and SHEETS.

FACTORIES, WATERBURY, CONN.

DEPOTS:

428 Broome Street, New York. 210 Lake Street, Chicago.
20 High Street, Boston.

JOHN DAVOL & SONS,

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

**COPPER, TIN, SPELTER,
LEAD, ANTIMONY.**

100 John Street, - New York.

WILLIAM S. FEARING.

100 Chambers St., NEW YORK,

SELLS TO THE TRADE

*Sheet Brass, Fancy Sheet Brass,
German Silver, Copper, Brass
and German Silver Wire,
Braze and Seamless Brass and
Copper Tubes, Brass and Cop-
per Rods, Brass Ferrules,
Pure Copper Wire,
Sheet and Ingot Copper, Spelter,
Tin, Antimony, Lead, &c.*

MATTHIESSEN & HEGELER ZINC CO.,

LA SALLE, ILLINOIS,

SMELTERS OF SPELTER

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc cut to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

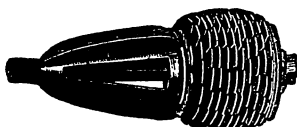
BRASS GOODS MFG. CO.,

Mfrs. of Stamped Brass, Silver and Nickel Goods, Brass Labels for Cans and Rubber Moulds.

BRONZE DOOR KNOBS

Bronze and Plated Roses, Combined Rose and Escutcheon Plates, Socket Shells, &c., Patent Mirror Pin
Cushion Business Cards, Mucilage Brushes. Novelties of new design made to order.

SALESROOM: 88 Chambers St., New York. FACTORY: 86-92 Third St., So. Brooklyn.



6 Inches and Over.

The Peerless STEEL
FLUE CLEANER,
FROM 1½ TO 16 IN.

For descriptive circular and prices ad-
dress the Manufacturer,

Jas. T. Mackay, St. Louis, Mo.



Under 6 Inches.

HENDRICKS BROTHERS,

Proprietors of the

Belleville Copper Rolling Mills,

Manufacturers of

Braziers', Bolt and Sheathing

COPPER.

COPPER WIRE AND RIVETS.

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

**MISSOURI
METAL COMPANY,**


923 Security Building,

ST. LOUIS.

SPELTER.

**ELEPHANT
BRAND**

**ALL GENUINE
INGOTS & MANUFACTURES
BEAR OUR
REG. TRADE MARKS.**



PHOSPHOR-BRONZE
INGOTS, CASTINGS, WIRE, SHEET &c.
THE PHOSPHOR BRONZE SMELTING CO. LIMITED
2200 WASHINGTON AVE. PHILADELPHIA, PA.
**ORIGINAL MANUFACTURERS OF PHOSPHOR-
BRONZE IN THE UNITED STATES AND SOLE
MAKERS OF "ELEPHANT BRAND" PHOSPHOR-BRONZE.**

**PHOSPHOR
BRONZE**

Parsons' Manganese Bronze and White Brass.

MADE IN THE UNITED STATES EXCLUSIVELY BY

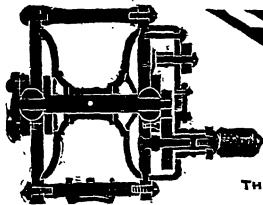
**THE WILLIAM CRAMP & SONS SHIP and ENGINE BUILDING CO.,
PHILADELPHIA, PA.**

MANGANESE BRONZE PROPELLERS
—ARE USED BY THE—

Cunard, Pacific Mail, Hamburg American, White Star, International,
Morgan, Canadian Pacific, North German Lloyds and many
other Steam Ship Companies, and principal Naval Powers.

Parsons' White Brass; the Most Approved Anti-Friction Metal.

G. DOUGLAS PETRIE, Agent, Nos. 39 & 41 Cortlandt Street, New York.



HENDRIX
Solicits Correspondence about
Fishing Reels for 15 Cents to 20 Dollars each.
Brass Bird Cages " 50 " 12 " "
Japanned " " 25 " 10 " "
Standard Bronze, Brass and Steel Chain.
Standard Wire Picture Cord.
THE ANDREW B. HENDRIX CO., NEW HAVEN, CONN., U. S. A.



THE F. L. GAYLORD CO.,
—MANUFACTURERS—

Aluminum Bronze Castings, Aluminum Bronze Sheets, Alu-
minum Bronze Ingots and Pure Aluminum
Castings.

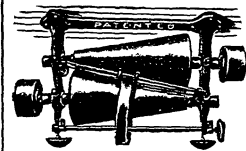
Box 1147, Ansonia, Conn.

Rough Casting of Aluminum.

Aluminum Bronze, German Silver Bronze and all
kinds of Metals. Manufacturers of Chandeliers, Metal
Picture Frames, Ink Stands, Figures, Statues, etc.
Stair Carpet Holders a Specialty.

St. Louis Bronze & Aluminum Works,
3741-3743 North Broadway,
ST. LOUIS, MO.

EVANS FRICTION CONES.



For regulating the
speed of machines au-
tomatically or by hand.
Thousands of sets in
operation driving all
kinds of machinery
which require from 1
to 50 H.P. Address
Evans Friction Cone Co.,
85 Water Street,
Boston, Mass.

**THE CRESCENT TRY IT!
AND YOU WILL USE NO OTHER**

**THE CRESCENT BRAND
PHOSPHOR
TIN.**

THE HIGHEST AND
RICHEST GRADE MADE
MANUFACTURED ONLY BY
THE CRESCENT PHOSPHORIZED METAL CO.
OFFICE AND WORKS
2107-2109 AND 2111 INDIANA AV. PHILADELPHIA, PA.

CROWN SMELTING COMPANY,

Chester, Pa.

Bronze, Brass and Composition Castings.

Inventors and Sole Manufacturers of

"Crown Bronze" Bearing Metal and "Crown ROLLING MILL Babbitt Metal."

Manufacturers of **PHOSPHOR-BRONZE TO PENNSYLVANIA RAILROAD.**

Specifications in ingot metal or castings

The W.W. & R. M. KEYS CO.,

Bronze,
Composition
and
Brass
Castings
of all kinds,
also
Babbitt
Metals

BRIDGEPORT, CONN.

BEST, FOX & CO.,

25th Street and A. V. Ry. - PITTSBURG, PA.

SOLE MANUFACTURERS OF

CLIMAX BRONZE

FOR ALL PURPOSES.

CASTINGS from 1 oz. to 12,000 lbs.

A

PHOSPHOR-TIN

BY USING MY PHOSPHOR TIN MANU-
FACTURERS CAN MAKE ANY DESIRED GRADE OF
PHOSPHOR BRONZE THEMSELVES. BY THE
SIMPLE PROCESS OF MELTING, MUCH
CHEAPER THAN THEY ARE NOW TO BE
HAD IN THE MARKET. NEW OR OLD COPPER
CAN BE USED. FOR CIRCULARS AND PRICES
ADDRESS **HALK & NAUMANN**, NEW YORK
SOLE AGENTS FOR THE U.S. AND CANADA, 3 PEARL

The American Metal Co.

(LIMITED),

Levin Building, 80 Wall St., New York.

P. O. BOX 957.

COPPER, COPPER ORES AND MATTES.
TIN, LEAD, SPELTER, ANTIMONY, NICKEL,
ALUMINUM, BULLION, IRON.

Advances made on Consignments.

AGENTS FOR

Henry R. Merton & Co., - London
Metallgesellschaft, Frankfurt-on-Main.
Williams, Foster & Co. Ltd., Swansea.

WASHBURN & MOEN MFG. CO.

Works: Worcester, Mass., and Waukegan, Ill.

Copper
Insulated
Glidden Barbed
Waukegan Barbed

WIRE

Rods
Springs
Bale Ties
Rope and Cable.

Makers of Iron, Steel and Copper.

Warehouses: New York, 16 Cliff St.; Chicago, 107 & 109 Lake St.; San Francisco, 8 & 10 Pine St.; Houston, Texas.



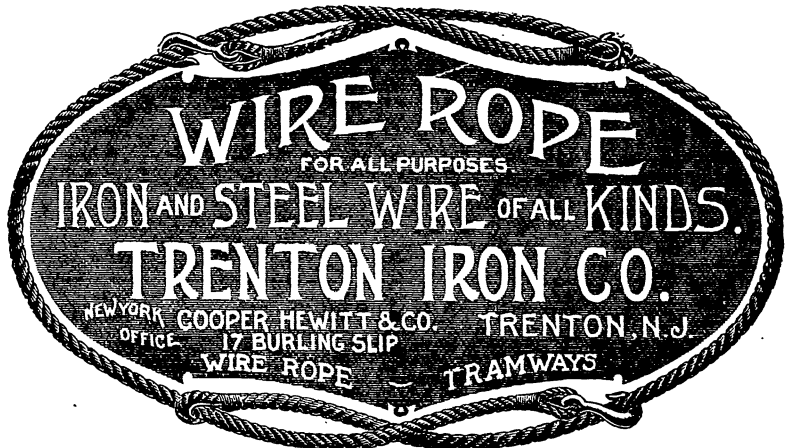
WM. MCFARLAND,
IRON FOUNDER,
TRENTON, - - N. J.
Chilled Cast Wire DIES
A SPECIALTY.
Any Size or Style Made at Short Notice.

J. F. KAY,
PASSAIC, N. J.
MACHINERY FOR MAKING OF
WIRE STRAND AND ROPE.
Winding, Stranding and Closing Machines, &c. Electric Wire and Cable Machinery. Hemp Rope and Cordage Machinery.
Plans and Estimates.

SPRINGS—RIVETS.
Specialties in
**SHEET METAL WORK,
CLOCK and INDICATOR POINTERS,**
CLARK & COWLES, Plainville, Ct.

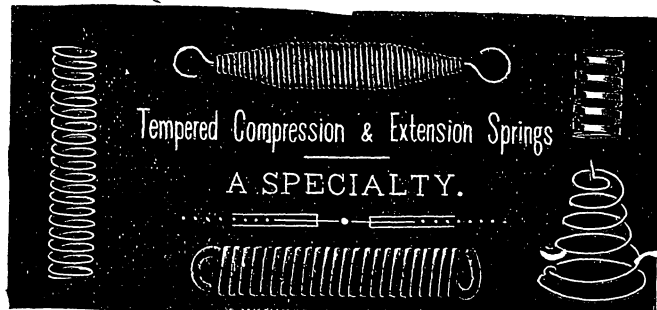
A Manual of Mining. Based on the course of lectures on mining delivered at the School of Mines of the State of Colorado. By M. C. IHLSENG, C.E., E.M., Ph.D., Professor of Engineering, Colorado State School of Mines; formerly of Columbia College School of Mines, New York City.
CONTENTS: Geognosy; Preparatory and Exploratory work; Methods of Mining; Hoisting Machinery Electricity and Water Power; Hoisting operations; Hoisting Conveyances; Underground Traffic Surface Transportation; Pumping; Ventilation; Methods of Ventilation; Distribution of the Air; Regulation of the Air Current; Illumination; Hygienic Conditions; Shafts; Sinking in Running Ground; Timbering; Drifts, Tunnels and Adits; Boring; Breaking Ground; Blasting; Drills and Drilling; The Compression of Air; Mine Examination.
427 pages, cloth.....\$4.00

For Sale by David Williams, 96-102 Rensselaer St., N. Y.



MILLER & VAN WINKLE,
MANUFACTURERS OF
STEEL WIRE AND STEEL SPRINGS.

TEMPERED STEEL WIRE.



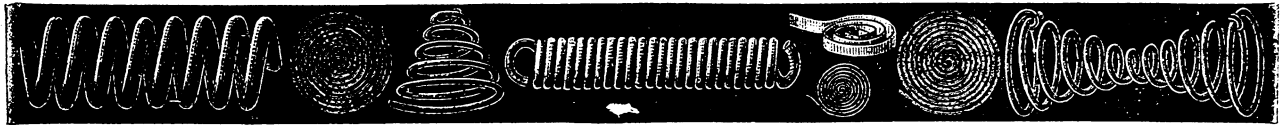
MACHINERY SPRINGS.



Guaranteed
Best Anti-Friction Metal for all machinery bearings. For high speed and heavy crushing weight it has no equal. It is used on bearings where no other known metal will stand.
Theo. Hertz & Son, Sole Mfrs.,
30th St. and Park Ave., St. Louis, Mo.
Mfrs Babbitt Metals, Solder, Lead Car Seals, etc.



117th to 118th Street and Harlem River. General Offices, Foot 118th Street, New York.



Makers of Iron, Bessemer, Siemens-Martin and Crucible Cast Steel Wire of all kinds, annealed, soft and hard drawn; Coppered Spring Wire for Furniture Springs, &c., Coppered Soft Wires, Baling Wires, Suspension Bridge and Rope Wires of all kinds, &c.

STEEL MUSIC WIRES and MUSIC SPRING WIRES,

UNRIVALED FOR PIANOFORTE STRINGS.

FOR THE HIGHEST CLASS OF SPRINGS.

Specialty of finest Cast Steel Wires, round, flat, square and any other shape, tempered and also in the soft state, guaranteed to harden and temper. Solid Rib and Paragon Umbrella Wires. Crinoline, Corset, Shade Roller, Lock, Hat, Brush, Saw, Band Saw, Clock Spring, Clock Bell, Clock Verge and Watch Spring, Rule and Tape Line and Eyeglass Wires, &c. Piano, Needle, Fish Hook, Drill and Hair Spring Wires. Special Cast Steel Wires of any kind made for special purposes. Also Covered Wires—Braided and Cloth and Paper Covered—for crinoline, corset and other purposes. Cold Rolled and Silt soft and Tempered Steel Strips of all kinds and for all purposes.

Special Wires and Springs of Every Description.

CORRESPONDENCE SOLICITED.

SAMPLES FURNISHED ON APPLICATION.

SUPERIOR STEEL COMPANY,

PITTSBURGH, PA.

MANUFACTURERS OF

Hot Rolled of any Exact Width up to 10 in. From No. 20 W. G. to 2 in. thick.

STRIP STEEL

Cold Rolled from 10 in. to 1-4 inch wide. Of Exact Thicknesses, from 3-16 in. to .005 in.

Bessemer, Open Hearth Soft, Special Soft and Spring, Crucible Cast Spring and Tool Steel, Clock Spring, Watch Main Spring, &c., &c.

WORKS LOCATED AT MANSFIELD, PA.

Capacity 30 Tons per Day.

EASTERN REPRESENTATIVES:

Ely & Williams, 38 Park Row, New York; 1239 Market St., Philadelphia, Pa.

Wire Cloth AND Wire Goods

Hardware Grade and Fanning Mill Wire Cloth, Poultry Netting, Heavy Window Screen Wire Cloth, Coal and Sand Screens, Riddles, Ash Sieves, &c., &c.



Office and Counter Railings, Elevator Enclosures, Wire Stall Guards, Hay Racks Feed Boxes, Window Guards, &c., &c.

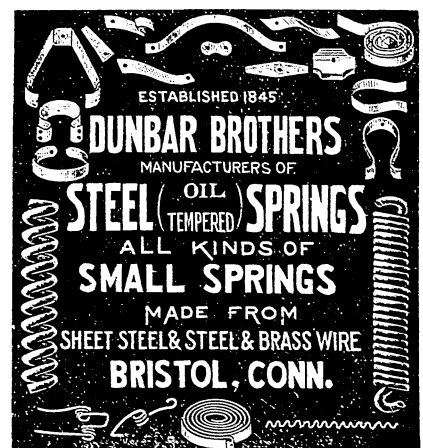
BUFFALO, N. Y.

VOLUTE, WIRE and FLAT STEEL

SPRINGS

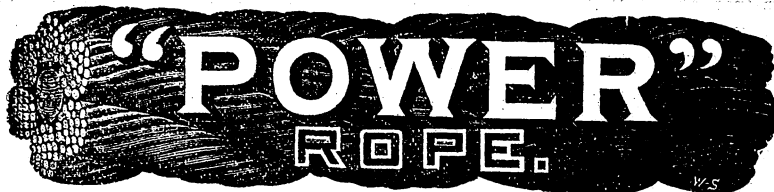
FOR Agricultural Implements, Machinery and various other purposes. Write for prices to

SABIN MACHINE CO., MANUFACTURERS. MONTPELIER, VT.



Coal Pits and Pitmen. By R. NELSON BOYD. A short History of the Coal Trade and the Legislation Affecting it. Illustrated, 12mo. cloth.....\$1.50 For sale by DAVID WILLIAMS, 96-102 Reade St. N.Y.

Always
Ask
For



Unequaled for Strength
and Durability.

Made Only by

Broderick & Bascom Rope Co.,
St. Louis, Mo.

HOWSON
AND
HOWSON

Counsellors at Law
Solicitors of Patents

PHILADELPHIA

Forrest Building, 119 S. 4th St.

NEW YORK

Potter Building, 38 Park Row.

WASHINGTON

Atlantic Building, 928 F St.

PATENTS

U. S. and Foreign Secured.

Trade Marks and Copy Rights. Twenty Years' Experience. Send model or sketch and brief description of your invention for Free report as to patentability. Expert searches and opinions as to Scope, Validity and Infringement. Patent Causes Prosecuted and Defended. Practice in U. S. Supreme, Circuit and Circuit Appeals Courts, and U. S. Patent Office.

Send for "Plain Words about Patents." Free.

PATENT PRACTICE EXCLUSIVELY.

References Furnished on Application.

E. B. STOCKING, Attorney at Law,
611 F ST., N. W., WASHINGTON, D. C.

PATENTS.

H. W. T. JENNER, Patent Attorney and Mechanical Expert. 519 Seventh St., Washington, D.C. Charges moderate. Write for terms. Established 1883.

CHARLES N. BUTLER, C.E.,

ATTORNEY IN PATENT CASES,

611 Mutual Life Building,
Tenth and Chestnut Sts., PHILADELPHIA, PA.

Formerly of the Examining Corps,
U. S. Patent Office.

W. S. ESTEY,

No. 65 FULTON ST., NEW YORK,

MANUFACTURER OF

WIRE CLOTH

Of Brass, Copper, Iron, Galvanized and Steel Wire of all meshes and grades. For Mining, Milling and all other purposes. Locomotive Spark Wire Cloth, &c.,

—AND—

WIRE WORK

For Bank, Office and Counter Railing, Store Fronts Window Guards, &c.

Galvanized Twist Netting.

Oliver's Patent Decoy Rat Traps.

S T Pat. Adjustable Foundry Riddles.

S T Sand Screens.

SEND FOR CATALOGUE.

The Prospector's Field-Book and Guide in the Search for and the Easy Determination of Ores and other Useful Minerals. By Prof. H. S. OSBORN, LL.D. EXTRACT FROM THE PREFACE: In the following pages we have attempted to present such a view of the whole subject of prospecting for the useful minerals that any liberally educated reader may fully comprehend our meaning. We have therefore explained special terms where we have thought it convenient to use them, and where the technically educated student would not need an explanation. The table of contents and index have both been carefully prepared, and being very full, will make reference to any subject in the volume easy and satisfactory. 44 engravings. 175 pages \$1.50

For sale by David Williams, 96-102 Reade St., N. Y.

A. LESCHEN & SONS' ROPE CO.,

MANUFACTURERS OF

Trade-Mark.



Registered.

ST. LOUIS, MO.

CORRESPONDENCE INVITED.



Williamsport Wire Rope Co., Williamsport, Pa.



WAREHOUSES: 87 Liberty St., New York.

WORKS:

Wilkesbarre, Pa.

NEW HAVEN WIRE MFG. CO.,

Manufacturers of

WIRE

In great variety.

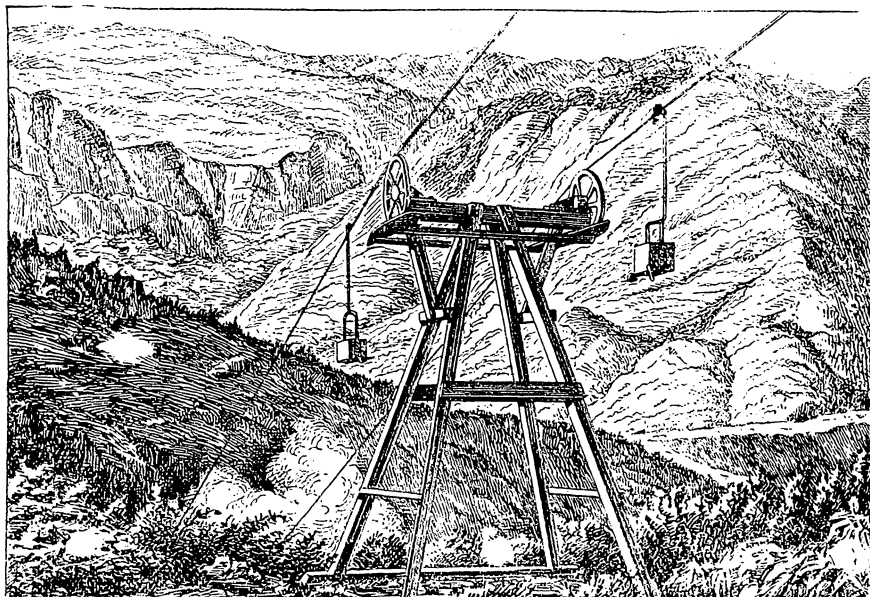
NEW HAVEN,

CONN.

Represented in New York by HENRY B. NEWHALL CO., 105 Chambers St.

CALIFORNIA WIRE WORKS,

509-511 MARKET STREET, SAN FRANCISCO, CAL.





Manufacturers of Wire Rope for Cable Railways and Mining Purposes.

HALLIDIE'S PATENT WIRE ROPEWAY

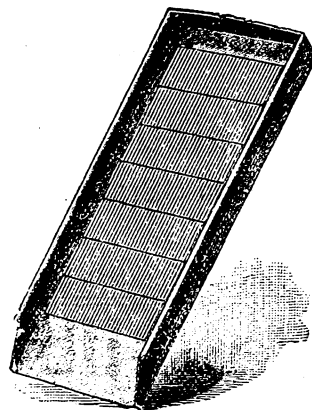
Simplest and most economical means of transportation. Send for Illustrated Catalogue.

HOWARD & MORSE
45 FULTON ST.
NEW YORK.
HEAVY MINING
COPPER,
BRASS,
STEEL
OR IRON
WIRE CLOTH.

ALSO MANUFACTURERS OF GENERAL WIRE WORK.
 Window Guards,
 Stable Fixtures,
 RAILINGS,
 Sand Screens
 Coal Screens
 Etc.

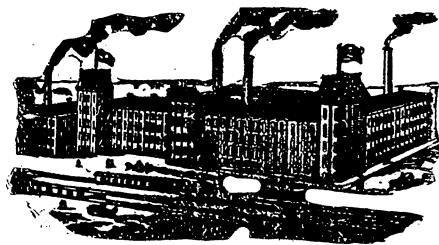



FLANGE STEEL SCREENS
 OF PERFORATED METAL
 For SAND, GRAVEL, COAL, and ORE.



THE HENDRICK MFG. CO., LTD.,
 CARBONDALE, PA.

WICKWIRE BROTHERS, **CORTLAND, N. Y.**
 MANUFACTURERS OF
Wire Cloth and Wire Goods,

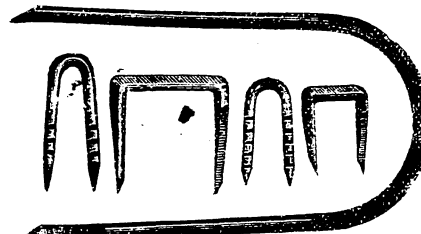


Coal Sieves,
 Flour Sieves,
 Corn Poppers,
 Dish Covers,
 Metallic
 Coal Sieves.

NEW PROCESS
Cortland
POWER LOOM
WIRE CLOTH.

Every roll wrapped in Pink Paper
 and has our name on label.

E. H. Titchener & Co.,
BINGHAMTON, N. Y.
 —MANUFACTURERS OF—



STAPLES in All Varieties,
 Double-Pointed Tacks, Bed Links, Etc.
 New York City Agents, **HARMON & DIXON,**
 118 Chambers Street.

Kilmer Manufacturing Co.

—Newburgh, N. Y.

Manufacturers of

BALE TIES

For Baling
 Hay, Straw,
 Rags,
 Excelsior, &c.

ALSO WIRE RODS, BARB WIRE, COILED STEEL WIRE, WIRE STAPLES, GALVANIZED WIRE, ORNAMENTAL FENCING, &c., &c.

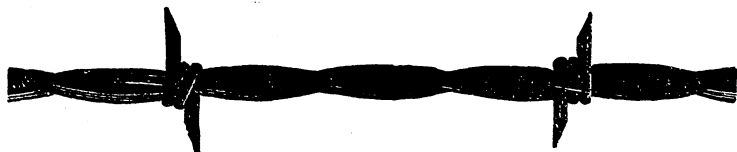
Western Warehouse, 543 and 545 State Street, Chicago, Ill.

Western Office 21 Quincy Street, Chicago, Ill.

New York Office, 111 Water Street, New York City.

Works and General Office, Newburgh, N. Y.

BARBED WIRE.



Prompt shipment made direct from our Warehouses.

BALE TIES, FENCE WIRE,
STAPLES, WIRE NAILS.
 WRITE US FOR PRICES.

LUDLOW-SAYLOR WIRE CO., St. Louis, Mo.

THE VAN DORN IRON WORKS CO., Cleveland, Ohio.



Office and Salesroom, 157 1/2 Euclid Ave.,
 MANUFACTURERS OF
WROUGHT IRON FENCE AND RAILING.
 Stable Fixtures, Crestings, Terminals, Wire Office and
 Counter Railing, Lawn Seats and Vases.
Iron and Steel Jail Cell Work. Orna-
mental and Structural Ironwork.

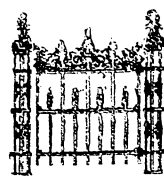
Quick Shipment. Write for Prices.

BARBED WIRE
 PLAIN
 CABLE

NAILS
STAPLES
STRETCHERS

INDIANA WIRE FENCE CO.,

Crawfordsville, Ind.

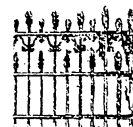


CHAMPION
IRON CO.

SPECIALTIES. — Iron
 Stairs and Jail Work, Build-
 ers' and Ornamental Iron
 Work, and the only manufacturers of Malleable
 Iron Cresting guaranteed against breakage; also
 manufacturers of the Celebrated
 Ohio Champion Iron Force and
 Lift Pumps. Send for 220-page
 Catalogue

Largest Iron Fence and
 Railing Works in U. S.

KENTON, O.



SPECIAL
WIRE
TACKS
 and
NAILS.

Particular attention given to
 production of goods adapted to
 special lines of business. Dupli-
 cating samples a specialty.

Taunton Wire Nail Co.,
 Taunton, Mass.

CLINTON WIRE CLOTH CO.,

— Manufacturers of Every Description of —

WIRE CLOTH, HEX. NETTINGS, WIRE LATH AND FENCING.

Perforated Metals. GALVANIZERS AND TINNERS OF **Wire Cloth and Nettings.**

Clinton "Standard" (Number 33 Wire) Painted Window Screen Wire Cloth.

FACTORY AND GENERAL OFFICE: CLINTON, MASS.

NEW YORK, 76 Beekman Street.

BOSTON, 199 Washington Street.

CHICAGO, 137 Lake Street.

The Gilbert & Bennett Mfg. Co.

— MANUFACTURE —

Pearl Window Screen Wire Cloth.
Galvanized Steel Wire Cloth.
Galvanized Wire Poultry Netting.
"Cottage" Lawn & Garden Fencing.
The World's Web Wire Fencing.
Sieves. Riddles. Screens.
Gilbert's Rival Ash Sifters.
House Furnishing Wire Goods

WIRE CLOTH, NETTING,
Fencing, Gates, Fencing Tools,
Wire Goods, Wire Work

RAILINGS, WINDOW GUARDS.
WIRE LATHING WITH HAMMOND'S METAL FURRING.

44 Cliff Street,
NEW YORK.

148 Lake Street,
CHICAGO.

Factories, { GEORGETOWN, CONN.
CHICAGO, ILLINOIS.
ESTABLISHED 1818.

WRIGHT & COLTON WIRE CLOTH CO., Worcester, Mass.



NEW PROCESS
HARD STEEL WIRE CLOTH AND NETTING
GALVANIZED
WIRE NETTING. Painted Window Screen Wire Cloth,

Patented March, 1884.
Patents Pending.

WIRE LATHING, HOUSE FURNISHING WIRE GOODS.

SEND FOR LATEST CATALOGUE.

OFFICE
233-235 ARCH. ST.

PENNSYLVANIA GALV'D POULTRY NETTING,
CORTLAND PAINTED WINDOW SCREEN WIRE,
CLOTH, ADJUSTABLE WINDOW SCREENS, BRASS
AND IRON GRILLES, WROUGHT IRON RAILINGS,
AND WINDOW GUARDS; BRASS, COPPER, STEEL AND
IRON WIRE CLOTH; GALVANIZED WIRE CLOTH.
CORRESPONDENCE SOLICITED.

EDWARD DARBY & SONS.—PENNSYLVANIA.

WIRE WORKS.
PHILADELPHIA
PA.

PAINTED AND GALVANIZED WINDOW SCREEN CLOTH.

IRON, STEEL, BRASS AND COPPER WIRE CLOTH.

MANUFACTURERS
**THE ROEBLING
STANDARD
WIRE
LATHING.**

**NEW JERSEY
WIRE CLOTH CO.**

**"JERSEY"
POULTRY
NETTING
AND FARM
FENCING.**

TRENTON, 117 and 119 LIBERTY STREET,
NEW JERSEY.

NEW YORK.

171 and 173 LAKE STREET,
CHICAGO.

25 and 27 FREMONT STREET,
SAN FRANCISCO.

BORDEN & LOVELL,
70 AND 71 WEST STREET,
NEW YORK.

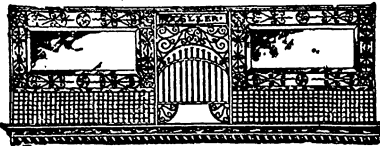
Steel, Iron and Wire Nails.

HIGHEST AWARD

Received at World's Fair on
Bank and Office Railing, Wire and Iron
Fencing, Flower Vases, Cheese Safes, Station
House or Jail Cells.

E.T. BARNUM, Detroit, Mich.

Mention this paper.



Perforated Filter
Press Plates.BRONZE SCREEN PLATES
To withstand action of
ACIDULATED WATERS.**PERFORATORS OF STEEL, IRON, COPPER, ZINC, BRASS AND TIN.**GRAIN CLEANING AND MINING MACHINERY,
WOOLEN, COTTON, PAPER AND PULP MILLS,
RICE, FLOUR AND COTTON SEED OIL MILLS,
SUGAR AND MALT HOUSES,
DISTILLERIES, FILTER PRESSES,

FOR USE IN

STONE, COAL AND ORE SCREENS,
BRICK AND TILE WORKS, FILTERS,
SPARK ARRESTERS, GAS AND WATER WORKS,
OIL, GAS AND VAPOR STOVES,
COFFEE MACHINERY, ETC., ETC.**STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.**

Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A. Eastern Office, No. 284 Pearl St., New York.

Just published, Fourth Edition, carefully revised and partly re-written, in one thick volume, Medium 8vo, 420 pages with Illustrations, price \$6 00, strongly bound for office use.

THE WORKS MANAGER'S HANDBOOK

OF

MODERN RULES, TABLES AND DATA

For Civil and Mechanical Engineers, Millwrights and Boiler Makers;
Tool Makers, Machinists and Metal Workers; Iron
and Brass Founders, etc., etc.

BY

WALTER S. HUTTON,

CIVIL AND MECHANICAL ENGINEER.

The Author having been in the habit of compiling Rules and Data for his own use in the construction of a great variety of modern Engineering Work, and having found his notes extremely useful, decided to publish them, after revising them to date, believing that a practical work, suited to the Daily Requirements of Modern Engineers, would be favorably received by the public.

The rapid sale of the previous Editions, and the continued favor the Work has received, show that it has been of considerable service to Engineers.

In issuing a Fourth Edition, many alterations and improvements have been made, including the following amongst other additions, viz.: New matter relating to Steam Engines—Gas Engines—Pumps—Water Supply, etc., etc.

Any book published sent, postpaid, on receipt of price by

DAVID WILLIAMS, Publisher and Bookseller, 96-192 Reade St., New York.

HERCULES WIRE. PATENTED.



Absolutely the best general purpose Fence Wire on the market to-day. Write for prices.
CLEVELAND FENCE CO., 21 Biddle St., INDIANAPOLIS, IND.



WRITE FOR CATALOGUE & PRICE LIST

THE CELEBRATED

"SILVER FINISH"

GALVANIZED POULTRY NETTINGS.

OR SALE BY THE HARDWARE TRADE.

GET THE BEST



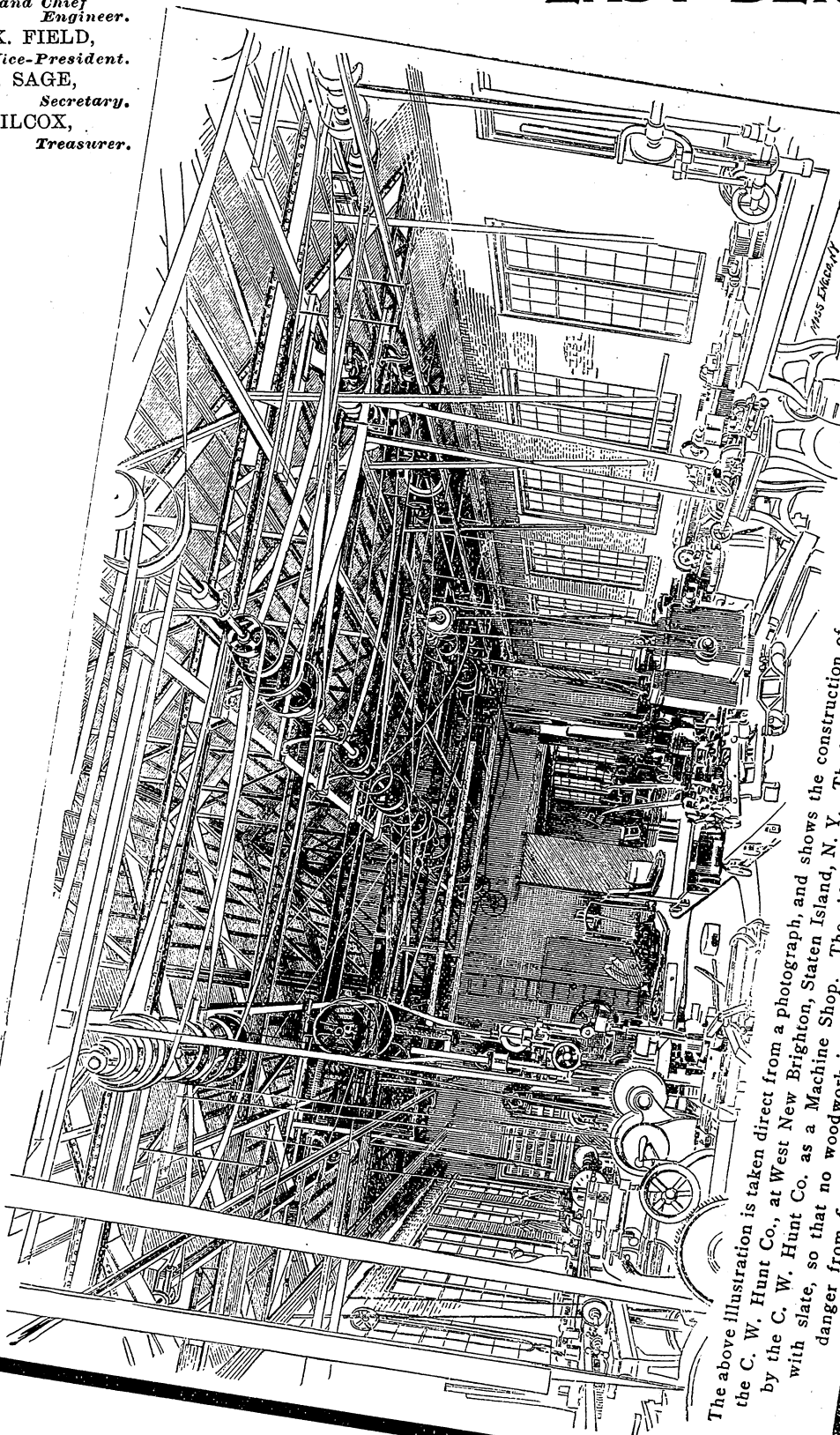
THE BERLIN IRON BRIDGE Co.,

OFFICE AND WORKS,

EAST BERLIN,

CONN.

CHAS. M. JARVIS,
Pres. and Chief Engineer.
BURR K. FIELD,
Vice-President.
GEO. H. SAGE,
Secretary.
F. L. WILCOX,
Treasurer.



The above illustration is taken direct from a photograph, and shows the construction of an Iron Truss Roof designed and built by us for the C. W. Hunt Co., at West New Brighton, Staten Island, N. Y. The building is 42 feet in width by 202 feet in length, and is used by the C. W. Hunt Co. as a Machine Shop. The side walls are of brick and the roof trusses of iron with iron purlins covered with slate, so that no woodwork is used about the construction in any way, shape or manner, thus eliminating entirely the danger from fire. This is one of the best designed and equipped Machine Shops of its size in the United States.

**Engineers,
Architects
and
Builders
in
Iron
and
Steel.**

Send for Illustrated Catalogue.

ATLAS TACK CORPORATION.**508 SEARS BUILDING, BOSTON, MASS., U. S. A.**

BRANCHES: **DUNBAR, HOBART & CO., WHITMAN, MASS.** ESTABLISHED IN 1810. **CONSOLIDATED 1891.** **LORING & PARKS, PLYMOUTH, MASS.** ESTABLISHED IN 1842. **A. FIELD & SONS, TAUNTON, MASS.** ESTABLISHED IN 1827. **TAUNTON TACK CO., TAUNTON, MASS.** ESTABLISHED IN 1854. **AMERICAN TACK CO., FAIRHAVEN, MASS.** ESTABLISHED IN 1867. **OLD COLONY RIVET CO., PLYMOUTH, MASS.** ESTABLISHED IN 1868.

MANUFACTURERS OF

Tacks, Brads, Small Nails, Shoe Nails, Lining and Saddle Nails, Tufting Nails and Buttons, Wire Nails, Finishing Nails, Patent Brads, Hungarian Nails, Steel Shanks for Boots and Shoes, Wire Tacks, Escutocheon Pins, Eyelets, Glaziers' Points, Rivets, Burrs, Furniture Springs, Pilgrim Spring Bed, and other articles.

We have the largest and only complete and fully assorted stock in the world. Our manufacturing facilities are unequalled. The foregoing well known brands we continue to use, and either will be furnished upon request. We have long distance telephone connection with our New York Store and our factories.

MAIN OFFICE, 508 SEARS BUILDING, 199 WASHINGTON ST., BOSTON, MASS.**BRANCH OFFICE & WAREHOUSE, 81 WARREN ST., NEW YORK.****BRANCH OFFICE & WAREHOUSE, 239 & 241 LAKE ST., CHICAGO, ILL.****BRANCH OFFICE & WAREHOUSE, 408 MARKET ST., SAN FRANCISCO, CAL.****BRANCH OFFICE & WAREHOUSE, 406 COMMERCE ST., PHILADELPHIA, PA.****BRANCH OFFICE & WAREHOUSE, 14 WEST GERMAN ST., BALTIMORE, MD.**

Tacks, Wire Nails and Brads, Hoop Nails, Staples, Silver and Japanned Lining and Saddle Nails, Double Pointed Tacks, Slating and Roofing Nails.

BONNIE BLUE TACKS.
100 Kegs in a Box,
Assorted 3 to 12 oz.
Retail 2 Kegs for 5
cents.

PARISIAN GILT NAILS.
20 papers in Car
ton. 5 cent seller.

MONARCH WOOD KEG CARPET TACKS.
5 cent seller.

"JUST ENOUGH"
Brass Nails. 100
Nails in a Paper, just
enough to top a pair
of shoes; 20 papers in
Carton. 5 cent seller.

DOUBLE ENOUGH
Cobblers' Nails. 200
Nails in a Paper, 20
Papers in Carton. 5
cent seller.

BILL NYE BRAD BOX.

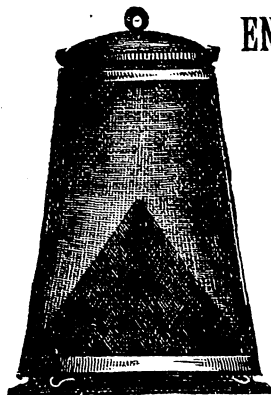
168 Papers Wire Brads, assorted $\frac{1}{2}$ to
2 in. Each Paper just right to retail for
5 cents.

**The New York Iron Roofing and Corrugating Co.**

Finest and Largest Variety of Sheet Metals. Products manufactured in the U.S. **FIRST & WASHINGTON STS. JERSEY CITY, N.J.**

THE "Paragon"

Increases in sales
Every year. **Why?** Because they are

**ENDORSED**

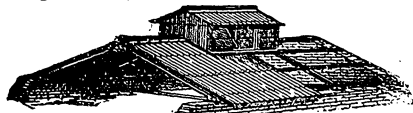
by every purchaser.

WRITE THE

**Bromwell
Brush & Wire
Goods Co.,**

Cincinnati, - - Ohio.

Corrugated, Crimped and Clap-Board Iron Roofing & Siding.



Iron Buildings, Roofs, Doors, Shutters, Cornices,
Skylights, Bridges, &c.

MOSELEY IRON BRIDGE AND ROOF CO
Office 5 Dey Street, Room 13. NEW YORK.

REYNOLDS & CO.

MANUFACTURERS OF

SET, CAP AND MACHINE SCREWS,

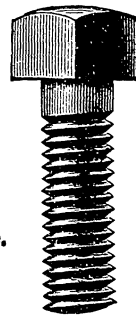
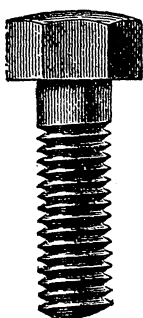
Studs, Coupling Bolts, Stove Bolts, Finished Nuts, &c.



Also Hand and Draw-plate Moulding Machines for Foundry Use.

NEW HAVEN, CONN.

SEND FOR CATALOGUE.

**PROTECT**

Your Offices, Stores and Warehouses from fire and burglars by using

Metallic Doors and Shutters

Made from wood and covered with iron or steel, rendering them stiff and preventing warping in case of fire.
Made from heavy boiler plate iron.
Made from double corrugated iron or steel.
Made to fit any size opening.

Estimates furnished upon application.

GARRY IRON & STEEL ROOFING CO.,
CLEVELAND, OHIO.



Mention The Iron Age.



U. S. CENTENNIAL EXHIBITION
1876



METROPOLITAN MECHANICS INSTITUTE



UTICA MECHANICS ASSOCIATION
1856



FRANKLIN INSTITUTE
1856



AMERICAN INSTITUTE
1855



WORLD'S FAIR, N.Y.
1853



AMERICAN INSTITUTE
1841

ESTABLISHED 1838.

American Screw Company,

Providence, Rhode Island,

Has Received an Award at the
**World's Columbian
Exposition**

For Wood and Machine Screws,
Bolts and Rivets.



AMERICAN INSTITUTE
1891



MASS. CHARITABLE MECHANIC ASS'N
1890



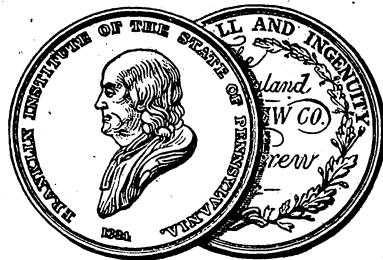
EXPOSITION UNIVERSELLE
PARIS, 1889



MIDDLESEX MECHANIC ASSOCIATION
1861



HARTFORD CO. AGRICULTURAL SOCIETY
1842



FRANKLIN INSTITUTE
1842



MASS. CHARITABLE MECHANIC ASS'N
1844



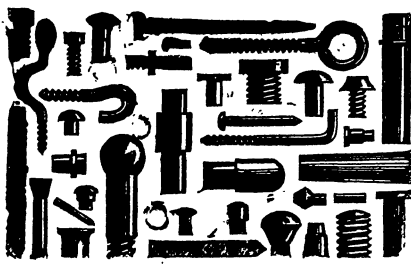
AMERICAN INSTITUTE
1847



WORCESTER CO. MECHANICS ASS'N
1849



MASS. CHARITABLE MECHANIC ASS'N
1850



IRON AND BRASS RIVETS,

STUDS, PINS, SCREWS, &c.,

For Manufacturers of Light Hardware.

BLAKE & JOHNSON, WATERBURY, CONN.

NEW CASTLE WIRE NAIL CO.,

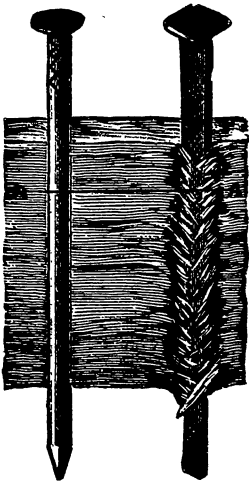
MANUFACTURERS OF



WIRE RODS AND WIRE.

Office and Works,

NEW CASTLE, PA.



THE SALEM WIRE NAIL CO.

MANUFACTURERS

WIRE NAILS,

Works: SALEM, O.; FINDLAY, O.

General Office: - SALEM, OHIO

BRANCH OFFICES:

Room 28, 277 Broadway, New York.

415 Phenix Bldg., Chicago.

200 Amer. Central Bld'g, St. Louis.

19-20 Ainsworth Block, Portland, Ore.

38 Pickering Bld'g, Cincinnati, O.

OXFORD

IRON AND NAIL CO.,
Cut Nails

AND

SPIKES.

J. S. SCRANTON, Sales Agent,

81, 83 and 85 Washington Street,
NEW YORK.

THE BOND NAIL.



These nails are made from different sizes of wire with head at any desired position between the points. For coopers, box and furniture manufacturers' dowels they are unsurpassed. Builders and repairers of all kinds will find these nails useful. We also manufacture Doweling Machines and Sets for driving these nails.

THE BOND NAIL CO.,
P. O. Box 23, RAYNHAM, MASS.

PHILLIPS, TOWNSEND & CO.,
North Penn Junction, Philadelphia.

WIRE NAILS, - - -
- - NORWAY RIVETS.

Rivets marked "P" are not of our make. We make only first-class NORWAY IRON RIVETS

COBB & DREW,
PLYMOUTH, MASS.

Manufacturers of Norway Iron Rivets, Brass and Copper Rivets, Burrs, Washers,
D. P. Tacks and Staples.

New York Agency, James S. Henderson,
successor to Disosway &
Henderson, Hardware.
Agents for Philadelphia Star Carriage
and Tire Bolts.

CLENDENIN BROTHERS,

SHEET
ROD
INCOT

COPPER

WIRE.
NAILS AND
TACKS.
RIVETS AND
BURS.

SEAMLESS BRASS AND COPPER TUBES.

Soldering Coppers

III South Gay St., - - Baltimore, Md.

BOOKS YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.

Standard Books On METALLURGY.

A Treatise on the Metallurgy of Iron.

Containing outlines of the history of iron manufacture, methods of assay and analyses of iron ores, processes of manufacture of iron and steel, &c. By H. Bauerman, F. G. S., associate of the Royal School of Mines. Fifth edition, revised and enlarged. Illustrated with numerous wood engravings from drawings by J. B. JORDAN. 515 pages: cloth.\$2

The Metallurgy of Steel.

Volume I. By HENRY M. HOWE, A.M., S.B. mining and metallurgical engineer; illustrated with many engravings and plates 383 pages; 11 x 14 inches.\$10

Handbook for Charcoal Burners.

Translated from the Swedish of G. Svedelius by PROF. R. B. ANDERSON, and edited with notes by PROF. W. J. L. NICODEMUS, C.E.: 23 wood engravings; 217 pages; cloth..\$1.50

The Metallic Alloys.

A practical guide for the manufacture of all kinds of alloys, amalgams and solders, used by metal workers; together with their chemical and physical properties and their application in the arts and the industries; with an appendix on the coloring of alloys. Translated and edited chiefly from the German of A. KRUPP and ANDREAS WILDBERGER, with extensive additions by Wm. T. BRANNT; illustrated by 16 engravings; 428 pages; cloth.\$3.00

The Metal Worker's Handy Book of Receipts and Processes.

Being a collection of chemical formulas and practical manipulations for the working of all the metals and alloys, including the decoration and beautifying of the articles manufactured therefrom, as well as their preservation. Edited from various sources by WILLIAM T. BRANNT. 530 pages; cloth..\$2.50

Electro-Plating.

A practical hand-book on the deposition of copper, silver, nickel, gold, aluminum, brass, platinum, &c. With descriptions of the chemicals, materials, batteries and dynamic machines used in the art. Second edition: carefully revised, with additions. By J. W. URQUHART; 220 pages; cloth.....\$2

Steel and Iron.

Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the rolling mills, the forge and the foundry. By WILLIAM HENRY GREENWOOD, F.C.S. With 97 diagrams; 536 pages; cloth.....\$2

An Introduction to the Study of Metallurgy.

By W. C. ROBERTS-AUSTEN, C. B., F. R. S., Associate of the Royal School of Mines, Chemist and Assayer of the Royal Mint, Professor of Metallurgy in the Royal College of Science, with which the Royal School of Mines is incorporated. CONTENTS: Physical properties of metals; alloys; the thermal treatment of metals; fuel; materials and products of metallurgical processes; furnaces means of supplying air to furnaces; typical metallurgical processes; economic considerations. With numerous diagrams, 292 pages, cloth.....\$2.50

Sent, postpaid, on receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller.

96-102 Reade St., New York.

Gautier Steel Department of Cambria Iron Co.,

JOHNSTOWN, PA.

—: MANUFACTURERS OF:—

MERCHANT BAR STEEL:

Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, etc.

AGRICULTURAL STEEL AND SHAPES:

Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, etc.

PLOW STEEL:

Flat and Finished Plow Shapes, Digger Blades, Slabs, (Penn and Pernot), Hammered Lay, Rolled Lay, etc.

COLD ROLLED STEEL SHAFTING.

STEEL HARROW DISCS.

CAMBRIA LINK BARB WIRE.

New York Office,
102 Chambers St.

Philadelphia Office,
S. W. Cor. 5th & Commerce Sts.

Chicago Office,
209 Phenix Building.

Southern Office,
Chattanooga, Tenn.

THREE POINTS ON AN IRON ROOF.

It must be Effective,

It must be Durable,

It must be Cheap.

“Patent Edge” Corrugated Iron Has All Three.

It is the only Corrugated Iron suitable for Roofing. A reliable agent wanted in every county.

Our little book “The Life of an Iron Roof, or how long will it last,” sent free.

The Cincinnati Corrugating Co.,
BOX 312, PIQUA, OHIO.

H.W. JOHNS' ASBESTOS LIQUID PAINTS

SEND FOR SAMPLE CARD AND DESCRIPTIVE PRICE LIST.

H. W. JOHNS MANUFACTURING CO.,

Sole Manufacturers of H. W. Johns' Asbestos Roofing, Sheathing, Building Felt, Asbestos Steam Packings, Boiler Coverings, Roof Paints, Fire Proof Paints, etc.

VULCABESTON Moulded Piston-Rod Packing Rings, Gaskets, Sheet Packing, etc.

Established 1858.

87 MAIDEN LANE, NEW YORK.

PHILADELPHIA, CHICAGO,
BOSTON, LONDON.

• STEEL ROOFING •
• CORRUGATED IRON EAVE TROUGH •
• CONDUCTOR PIPE • ROOF PAINTS • ETC.

CORRESPONDENCE
SOLICITED

THE CAMBRIDGE ROOFING CO

CAMBRIDGE,
OHIO.

Lukens Iron and Steel Co. INCORPORATED 1890.

The First to make Boiler Plates in America.

Chas. Huston, Pres. A. F. Huston, Vice-Prest. C. L. Huston, Genl. Mgr. Robt. B. Haines, Jr., Secy. Jos. Humpton, Treas.

STEEL AND IRON PLATES, ALSO SHEETS

TO EXTREME DIMENSIONS.

WIDTHS UP TO 10 FEET.

THICKNESS, No. 12 GAUGE TO 1½ INCHES.

—ESTABLISHED 1810.—

WORKS:

Coatesville, Pa.

NEW YORK OFFICE:

No. 28 Broadway.

PHILADELPHIA OFFICE:

62 & 64 Bullitt Bldg.

FRANK SAMUEL,
136-138 So. 4th St.,
Philadelphia.

LOW PHOSPHORUS

PIC IRON—.03 or under.
SCRAP—.03 or .05 or under.
ORE—For O. H. and Furnace Use.
MELTING BAR—
Open Hearth and Bessemer Billets,
Skelp, Muck Bars and Scrap, Foundry
and Bessemer Pig Iron.
Syracuse Tube Co.'s Tubes and Pipe.

THE PHOENIX IRON CO., 410 Walnut St., Philadelphia,

MANUFACTURE ALL THEIR PRODUCTS BOTH IN

WROUGHT IRON AND OPEN HEARTH STEEL.

Beams. Channels, Deck Beams, Angles, Tee-bars, Zee-bars and other shapes, Round, Flat and Square BARS of all sizes, Especially adapted for Bridge and Ship Builders, Fire-proof Buildings, Shafting and all Structural Purposes.

SPECIALTIES, in Wrought Iron or Steel:—Phoenix Columns and Upset Eye-Bars of all sizes,

Roof Trusses, Girders, Joists and Built-up Shapes of every description.

AGENTS:—EDWARD CORNING & Co., 29 Broadway, NEW YORK; EDWARD CORNING & Co., 70 Kilby St., BOSTON, MASS; JAMES B. STOKES, 132 Market St., SAN FRANCISCO. WESTERN OFFICE: A. C. STITES, 931 The Rookery, CHICAGO.

POTTSVILLE IRON AND STEEL CO., POTTSVILLE, PA.,

PHILADELPHIA OFFICE, 226 SOUTH 4th STREET

MANUFACTURERS OF ALL KINDS OF

STRUCTURAL IRON AND STEEL,

Viz., I Beams, Deck Beams, Channels, Tees, Angles, Plates and Bars; and also Open Hearth Steel Billets, Blooms and Slabs.

BREWERY, MALT AND ICE HOUSE CONSTRUCTION A SPECIALTY.

Designers and Constructors of Roofs, Trusses, Columns, &c.

TESTED CHAINS.

BRADLEE & CO., - EMPIRE CHAIN WORKS,

Beach and Otis Streets, PHILADELPHIA.

Chains for Foundry Cranes and Slings, "D. B. G." Special Crane Chain. Steel and Iron Dredging, Slope and Mining Chains. Ship's Cables and Marine Railway Chains.

S. T. WELLMAN, President.
S. H. CHAUVENET, Vice-President.

J. H. ROOP, Treasurer.
RICHARD PETERS, Jr., Secretary.

C. H. WELLMAN, Superintendent.

WELLMAN IRON AND STEEL CO.

—MANUFACTURERS OF—

Highest Grade Open Hearth Low Phosphorus Steel Fire Box and Boiler Plate. Bessemer Steel Ship and Tank Plate. Open Hearth and Bessemer Blooms and Slabs.

Low Phosphorus Pig Iron.

—PLATES UP TO 126 INCHES IN WIDTH.—

General Office and Works, Thurlow, Delaware County, Pa.

Chicago, Ills., No. 656 "The Rookery."

E. W. CRAMER, Agent.

New York, N. Y., No. 7 Nassau Street,

J. H. BELCHER, Agent.

BARCLAY W. COTTON & CO.,

Successors to ESHERICK, COTTON & CO.,

Iron and Steel Merchants.

AGENTS FOR

AMERICAN WIRE GLASS MFG. CO.

418 Walnut St., PHILA.

WHEELER & CO.,

G. W. NICOLLS.

Nicolls, Wheeler & Co.,

FORMERLY

SITES, WHEELER & CO.,

216 South Third St., Philadelphia, Pa.

—DEALERS IN—

IRON AND STEEL SCRAP.

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c., Steel and Iron Plates, New and Old Rails.

EDWARD CORNING & CO.,

MANUFACTURERS' AGENTS AND COMMISSION MERCHANTS.

BEAMS, CHANNELS,
ANGLES, TEES, PLATES,
RIVETED GIRDERS.

IRON AND STEEL,

BARS, BANDS, HOOPS,
BOLTS, NUTS, RIVETS,
ROOF TRUSSES.

29 BROADWAY,
NEW YORK.

421 CHESTNUT ST.,
PHILADELPHIA.

70 KILBY ST.,
BOSTON.

OUR OFFICES AND MILLS ARE CONNECTED BY TELEPHONES.

EDWARD J. ETTING,
IRON BROKER & COMMISSION MERCHANT
 222 S. THIRD ST., PHILADELPHIA, PA.
 Pig, Bar and Railroad Iron, Old Rails, Scrap.
 AGENT FOR THE
MOUNT SAVAGE FIRE BRICK,
 Eastern Penna., West New Jersey and Delaware.
Agent TRENTON IRON CO.,
 For the Sale of Wire and Wire Rope.
 Longdale (Va.) and other Pig Irons.
 STORAGE YARD, Pier No. 57 South (old Navy Yard),
 which is connected with Penn. R. R. and its various
 connections. Negotiable Warehouse Receipts issued.
 CASH ADVANCES MADE ON IRON.

ESTABLISHED 1869.
JEROME KEELEY & CO.,
 The Philadelphia Bank Bldg., 421 Chestnut St.,
 PHILADELPHIA.
Foundry & Forge Pig Irons,
Iron Ores, Coke, Coal,
Steel Blooms, Billets, Rails, etc.
Muck Bars, Blooms, Scrap Iron.
 Consulting Engineers in Metallurgy and Mining.

JUSTICE COX, JR.,
 218 South 4th St., Phila., Pa
IRON and STEEL.
 — AGENT FOR —

Haldeman, Grubb & Co.'s.
 Chickies Bessemer Pig Iron.
 Mahoning Rolling Mill Co.'s
 Best Quality Skelp Iron and Steel.
 Pulaski Iron Co.'s
 High Grade Foundry and Forge Pig Iron.
 Hainsworth Steel Co.'s
 Standard Bessemer Steel Billets.
 Bars, Angles, Sheets, Tank and Bridge
 Plates, Muck Bars, Blooms, Scrap Iron
 and Tool Steel.

J. W. HOFFMAN & CO.,
 Bullitt Building, 135 So. 4th St., Philad'a,
Iron and Steel Merchants.
PIG IRON,
 Iron and Steel Plates, Sheets, Bars and Shapes. Rails,
 Cars and Locomotives. Track Equipment.
 CORRESPONDENCE SOLICITED.

JOHN L. HOGAN & CO.,
 IRON COMMISSION MERCHANTS,
 Bullitt Building, 135 South Fourth St., Phila.
Agents for Brier Hill, Lehigh, Struthers
AND MUIRKIRK PIG IRON,
 Delaware Rolling Mill, muck bars. Youngstown Steel
 Co., Connellsville Coke.

W. H. THOMSON & CO.,
 Dealers in
IRON and STEEL and
other METALS
FOR ALL PURPOSES,
 Room 259, Bullitt Building,
PHILADELPHIA, PA.

B. Houston. J. Max Bernard. H. H. Houston
C. B. HOUSTON & CO.,
 Bullitt Building. **PHILADELPHIA**

Pig Iron, Coal, Coke, Steel Rails, Structural
Iron, Steel Castings and Fire Brick.
 Sole Agents for **PAXTON ROLLING MILLS.**
STEEL AND IRON PLATES

FRANCIS WISTER
 COMMISSION MERCHANT,
Coke, Coal, Ores.
 PEA AND BUCKWHEAT (Red and White Ash).
 National Foundry Coke a Specialty. Sulphur less
 than 0.5.
 All Sizes National Crushed Coke.
 420 Walnut Street, **PHILADELPHIA.**

W. S. PILLING.

T. I. CRANE

PILLING—AND—CRANE.
IRON ORES: Lake Superior, Foreign, Concentrates,
 Magnetic and native Self-fluxing.
PIG IRON: Low Phosphorus, Open-hearth, Bessemer
 and other grades.
STEEL: In Blooms, Slabs and Billets, and scrap.
COKE: For Furnace and Foundry use.
BULLITT BUILDING, 141 S. FOURTH ST., PHILADELPHIA.

ALAN WOOD COMPANY,
 MANUFACTURERS OF
 Patent Platinized, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom,
PLATE & SHEET IRON.
 ALSO LIGHT PLATES AND SHEETS OF STEEL,
 No. 519 Arch Street, Philadelphia, Pa.
 Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack,
 Tank and Boat Iron: Last, Stamping, Ferrule, Locomotive Headlight and Jacket Iron.

CUMBERLAND NAIL AND IRON CO.,
 MANUFACTURERS OF
 "Cumberland" Nails & Wrought Iron Pipe,
 43 North Water St., and 44 North Delaware Ave., PHILADELPHIA.

J. J. MOHR,
 Bullitt Building, No. 131 South Fourth St., Philadelphia, Pa.
 —SOLE AGENT FOR—
 Sheridan, Temple, Brooke, Leesport, Mill Creek, Keystone, Mt. Laurel, Logan and Oley FOUN-
 DRY, FORGE, CHARCOAL AND BESSEMER PIG IRON.
 Dealer in Scrap, Old Car Wheels, Muck Bars and Connellsville Coke.

JAMES G. LINDSAY & CO.
 BULLITT BUILDING, 133 South Fourth St., PHILA.
IRON and STEEL STRUCTURAL MATERIAL
 For all purposes. Estimates furnished for Iron and Steel Structures.

High Grade Tested Chains.
JAMES MCKAY & CO.,
 29TH & LIBERTY STREETS, **PITTSBURGH, PA.**
 Manufacturers of Coil, Crane and Stud Chain. We also manufacture High Grade
 Steel Chain made of Basic Steel and Special Crane Chain made of U. S. Iron.

FITZSIMONS & CO.,
 —MANUFACTURERS—
COLD DRAWN SHAFITING IRON STEEL
CLEVELAND, OHIO.

WEST'S MOULDERS' TEXT BOOK
 BEING PART II. OF AMERICAN FOUNDRY PRACTICE,

Giving the best methods and rules for obtaining good castings, with detailed
 description for making moulds. A thoroughly practical book
 that should be in the hands of every moulder.

PRICE, - Cloth, - 460 Pages, - - \$2.50.

SENT, POST-PAID, ON RECEIPT OF PRICE BY

DAVID WILLIAMS, Publisher and Bookseller,
 96-102 Reade Street, - - - New York City

FRANCIS HOBSON, SEAMAN & CO.,

Successors to FRANCIS HOBSON & SON,
DON STEEL WORKS, SHEFFIELD.

Sole Manufacturers of

HOBSON'S "CHOICE" (XX) Extra Best and "Warranted Best"
Cast Steels for Tools, etc.

HOBSON'S "CHOICE" Extra Quality Needle Wire.

SEAMAN'S "NELSON" Brand Extra Cast Steel for Turning Hardest Chilled Rolls, &c.
WAREHOUSE, 97 John St., New York. CHAS. HUGILL, Agent.

THOS. FIRTH & SONS, LIMITED, SHEFFIELD.
CRUCIBLE CAST STEEL.

ABBOTT, WHEELOCK & CO., Agents and Importers of
SWEDISH IRON,

85 OLIVER ST., BOSTON.

23 CLIFF ST., NEW YORK.

S. & C. WARBLow, SHEFFIELD, ENGLAND.

Manufacturers of the Celebrated Cast and Double Shear Steel.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch and all other Springs; also Sole Makers of the Special Brand "TOUGH" Cast Steel for Leather Splitting and Machine Knives of every description, and for Turning and all other Tools, Dies and Punches.

Office and Warehouse, 95 John St., New York.

Frank S. Pilditch, Agent.

GUSTAF LUNDBERG,

Agent for N. M. HOGLUND'S SONS & CO. of Stockholm.

Swedish and Norway Iron.

Bessemer and Open Hearth Steel.

19 KILBY STREET, BOSTON.

CARLISLE WORKS, KAYSER, ELLISON & CO., SHEFFIELD, ENGLAND
Late WILSON HAWKSWORTH, ELLISON & CO.,

(ESTABLISHED 1825.)

CRUCIBLE STEEL AND STEEL WIRE.

WETHERELL BROS., Agents.

31 OLIVER STREET, BOSTON.

93 LIBERTY STREET, NEW YORK.

JONAS & COLVER CONTINENTAL STEEL WORKS, SHEFFIELD, ENGLAND,

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Corset Springs, Band Saws, Clock and Watch Springs and Parts, and all other Purposes.

HERMANN BOKER & CO., 101 & 103 Duane Street,

(Formerly CARL F. BOKER),

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

JESSOP'S STEEL

MANUFACTURED BY

OF Best Quality,
IN Bars, Sheets AND Plates

Large assortment of sizes in stock at

91 John St., - - - NEW YORK,

And other Agencies.

WM. JESSOP & SONS, L'D.

SHEFFIELD,
ENGLAND.

Gold Medal Paris,
1889.

WIRE

DRAWING

WORTLES, PLATES and JEWEL DIES.

DIES

NEWTON & SHIPMAN,

83 John St., - New York.

CAMBRIA STEEL,
Steel Rails, STANDARD AND LIGHT WEIGHTS, Street Rails and Railway Fastenings,
 BESSEMER AND OPEN-HEARTH BLOOMS, BILLETS AND BARS.
Steel Axles, Steel Angles, Steel Channels, Steel Forgings.
CAMBRIA IRON COMPANY, Office, 218 S. Fourth St., Philadelphia.
 Chicago Office, Phoenix Building.
 (WORKS AT JOHNSTOWN, PA.)

A. & P. ROBERTS & COMPANY,
Pencoyd Iron Works, MANUFACTURERS OF
Wrought Iron and Open Hearth Steel,
 OFFICE: 261 S. 4th Street, PHILADELPHIA, Pa.

Pencoyd Bridge & Construction Co., DESIGNERS AND MANUFACTURERS OF
Bridges, Viaducts, Turn Tables, Etc.
 WORKS, PENCYD, PA.

R. H. Wilson. A. Kaiser. J. B. M. Hiron.
E. H. WILSON & CO.,
 222 and 224 South Third St., Philadelphia
 BROKERS AND DEALERS IN
IRON AND STEEL.
 Correspondence solicited.


PIERSON & CO.,
 —DEALERS IN—
IRON and STEEL
 OF EVERY DESCRIPTION,
 29 Broadway, cor. Morris St.,
 NEW YORK.

A. R. WHITNEY & CO.,
 MANUFACTURERS AND DEALERS IN
IRON and STEEL.

AGENCIES:
 CARNEGIE STEEL CO., Limited, Structural Material, Steel and Iron Columns, Beams, Channels, Shapes and Plates. Steel Beams Rolled to 24 inches deep.
 PORTAGE IRON CO., Limited, Merchant Iron, Bars, Angles, Hoops and Cotton Ties.
 BROOKLYN WIRE NAIL CO., Steel Wire Nails. Export Nails a Specialty.
 RIVERSIDE IRON WORKS, Steel Pipe.
 GLASGOW TUBE WORKS, Boiler Flues.
 AMERICAN WIRE NAIL MACHINES. Over 900 working satisfactorily in the United States, 25 in Europe and 100 in Canada.
 THE SEIDELL & HASTINGS CO., Charcoal Iron Boiler Plates.
 Plans and estimates furnished and contracts made for Iron and Steel Structures of every description. Please address,
 29 Broadway, New York.
 P. O. Box 33.

NORTH BROTHERS MFG. CO.
Iron and Brass Founders
Light Castings a Specialty.
 N. W. Cor. 23d and Race Streets,
 PHILADELPHIA.
 Correspondence solicited.

AMERICAN
PIC IRON STORAGE WARRANT CO.,
 (Bank of America Building.) 44 Wall St., N. Y.
 Correspondence of Furnaces Invited.

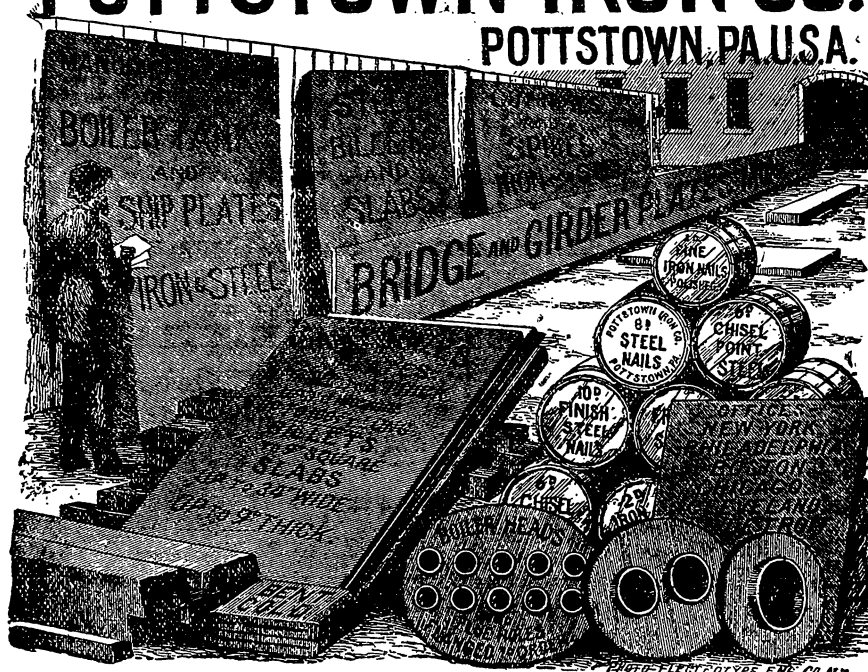


Hundreds of testimonials showing these castings have proved the most satisfactory and economical for all purposes requiring strength and durability

CHROME STEEL WORKS,
 Brooklyn, N. Y.

A. MILNE & CO.,
Swedish (Norway) Iron and Steel,
 BLOOMS, BILLETS, BARS; WIRE, RIVET AND NAIL RODS.
FOREIGN AND DOMESTIC IRON AND STEEL.
 1 Broadway, New York. 8 Oliver Street, Boston.

POTTSTOWN IRON CO.
 POTTSTOWN, PA. U.S.A.



FRANKFORD STEEL COMPANY.
 FRANKFORD, PHILA., PA.

Steel Railroad and Machine Forgings,
 SOLID CRUCIBLE STEEL CASTINGS
 AND
 Best Grades of Tool and Machinery Steel.

 **CRESCENT STEEL CO.**
 180 PEARL ST. NEW YORK PITTSBURGH, PA. 64 & 66 S. CLINTON ST. CHICAGO.

ÆTNA-STANDARD IRON AND STEEL CO.,Successors to **Ætna Iron and Steel Co., and The Standard Iron Co.,** Manufacturers of**PLATES and SHEETS, BLACK, GALVANIZED and CORRUGATED Plain Roofing, Siding and Ceiling, also of Sheet Steel, for special purposes, Cold Rolled or Plain and Patent Leveled.****BARS, LIGHT SECTION RAILS, ANGLES, TEES and CHANNELS, odd sections and sizes, Machine Straightened Steel Tire, Ordinary Shafting, Horse-Shoe Bars, Ax-Poll Steel, Toe Calk, Nut, Bolt and Chain Rods, and other special Bars suited to every requirement.****PROMPT SHIPMENT from STOCK.**Inquiries solicited. Stock List Mailed on Application. Address, **BRIDGEPORT, OHIO.****CARBON STEEL COMPANY, PITTSBURGH, PA.**

MANUFACTURERS OF

Universal Mill Plates.
Sheared Plates and
Sheets.Boiler, Ship and Armor
Plates.
Also Nickel Steel Plates,**LIST OF SIZES SENT UPON APPLICATION.****AGENCIES:****L. S. BOOMER, 647 The Rookery, Chicago, Ill.**
GEO. KINSEY & CO., 249 West Fourth Street, Cincinnati, O.
BULLARD & POST, 125 Milk Street, Boston, Mass.**THE CONDUIT-FULLER CO., Perry-Payne Building, Cleveland, O.**
JAS. G. LINDSAY & CO., Bullitt Building, Philadelphia, Pa.
GEO. C. BEALS, Erie Co. Savings Bank Building, Buffalo, N. Y.**- R. M. MUSHET'S -**
"SPECIAL," STEEL "TITANIC,"FOR
LATHE AND PLANER TOOLS.

(The "Trade-Marks" of which are registered in the United States.)

For Chisels, Taps, Dies, Chilled Roll
Turning, Punches, &c., &c.

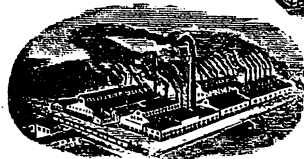
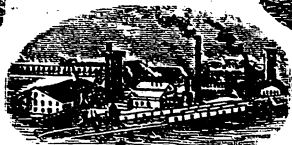
MANUFACTURED ONLY BY

SAMUEL OSBORN & CO., Clyde Steel & Iron Works, Sheffield, Eng.

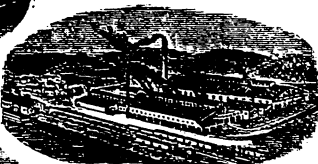
SOLE REPRESENTATIVES IN THE UNITED STATES,

B. M. JONES & CO., Nos. 11 and 13 Oliver St., Boston.**No. 143 LIBERTY STREET, NEW YORK.****RIVERSIDE IRON WORKS,**

Manufacturers of

"RIVERSIDE"
Steel Nails.Bessemer, Forge and
Foundry Pig Iron.RIVERSIDE FURNACE, BESSEMER
STEEL PLATE MILL AND TUBE DE-
PARTMENTS AT BENWOOD, W. VA.BAR MILLS, FORGE AND COAL MINES AT
WHEELING, W. VA.

FURNACE AND COAL SHAFT AT STEUBENVILLE

"RIVERSIDE"
Steel Pipe.Steel Billets, Blooms, Bar
Steel, T and Flat Rails.NAIL FACTORIES AND WAREHOUSE AT
WHEELING, W. VA.**WHEELING, . . . W. VA.**REPRESENTATIVES: CHAS. S. STEPHENS, No. 21 Beekman St., New York; E. R. MANN & CO., No. 147 So.
4th St., Philadelphia, Pa.; CASEY & DAY, No. 445 Rookery, Chicago, Ill.; THE HAZEN CO., No. 59 W. 4th
St., Cincinnati, O.**THE IRON FOUNDER.**

A COMPREHENSIVE TREATISE ON

The Art of Molding.

INCLUDING CHAPTERS ON

Core-making; Loam, Dry Sand and
Green Sand Molding; also Crystalliza-
tion, Shrinkage and Contraction of Cast
Iron, and a full explanation of the science
of Pressures in Molds; added to which
are Formulas for Mixtures of Iron, Tables,
Rules and Miscellaneous Information.

BY

SIMPSON BOLLAND,

Practical Molder and Manager of Foundries.

Illustrated with Over Three Hundred Engravings.
12mo. Cloth, \$2.50.**"The Iron Founder" Supplement.**

A Complete Illustrated Exposition of

**THE ART OF
CASTING IN IRON,**

COMPRISING THE

Erection and Management of Cu-
polas, Reverberatory Furnaces,
Blowers, Dams, Ladles, Etc.; Mixing
Cast Iron; Founding of Chilled
Car Wheels; Malleable Iron Cast-
ings; Foundry Equipments and Ap-
pliances; Gear Molding Machines;
Molding Machines; Burning, Chill-
ing, Softening; Annealing; Pour-
ing and Feeding; Foundry Ma-
terials; Advanced Molding; Meas-
urement of Castings; Wrought
Iron, Steel, Etc.; also the Founding
of Statues; the Art of Taking
Casts; Pattern Modeling; Useful
Formulas and Tables.

—BY—

SIMPSON BOLLAND,Practical Molder and Manager of
Foundries; Author of "The Iron
Founder," etc.

Illustrated with over Two Hundred Engravings.

400 Pages. 12mo, cloth, \$2.50.

Sent, post-paid, on receipt of price by

DAVID WILLIAMS, Publisher & Bookseller,

96-102 Reade St., New York.

THE CAMBRIDGE IRON & STEEL CO.

MANUFACTURERS OF

BLACK SHEETS
FOR ROOFING & CORRUGATINGPICKLED
& COLD ROLLED FOR STAMPINGCORRESPONDENCE
SOLICITEDCAPACITY RANGES FROM NO. 30
26 INCHES WIDE TO 14' 4" 40' 120"OFFICE & WORKS **CAMBRIDGE, OHIO.**

ESTABLISHED IN 1848. **SINGER, NIMICK & CO., Ltd.** PITTSBURGH, PA.

—MANUFACTURERS OF ALL KINDS OF—

Hammered and Rolled **STEEL.** Warranted Equal to any Produced.



HIGH GRADE SPECIAL Crucible Tool Cast Steel, for all purposes requiring the very finest quality.

SINGER'S ANNEALED EXTRA Crucible Tool Cast Steel, for Dies, Cutters, Surgical Instruments, Forceps, and all other purposes requiring an extra fine quality.

BEST Crucible Tool Cast Steel, for all purposes requiring steel of standard quality, such as Turning Tools, Taps, Dies, Drills, Punches, Shear Knives, Cold Chisels, or Edge and Machinists' Tools generally, and for Mining and Quarrying purposes.

SAW STEEL, for Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

HOT ROLLED SHEET STEEL, for Springs, Billet Web and Hand Saws, Nicker Saws, Pocket Knives, Blades and Backs, Drawing and Stamping Cold, &c., &c.

BRIGHT COLD ROLLED SHEET and STRIP STEEL, for Cold Drawing, Stamping and Bending; for Bells, Cups, Ferrules, Springs, Keys, Chains, Sewing Machine and Type-Writer parts, and to take the place of Sheet Brass, all of unequalled finish and accuracy of gauge.

ROUND MACHINERY STEEL, for Shafting, Rollers, Spindles, &c., &c.

AGRICULTURAL STEEL.

"Iron Centre" Cast Plow Steel.
"Soft Steel Centre" Cast Plow Steel.
"Soft Steel Back" Cast Plow Steel.
"Extra Thick Face Centre" Cast Plow Steel.

"Special" (Solid Soft Center) Plow Steel.
Crucible Cast Plow Steel.
Steel Rotary Harrow Discs.
Finished Rolling Plow Colters.
Agricultural Steel Cut to Pattern.

Also Wagon and Carriage Springs, Axles and Steel Tire.

Represented at 243 Pearl and 18 Cliff Streets, NEW YORK, by

HOGAN & SON, General Agents for Eastern and New England States.

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA & CO., 110 North St., Boston, and
W. E. STOCKTON, 16 & 18 West Lake St., Chicago.

HUGH RUSSEL, TEMPLE BUILDING, 185 ST. JAMES ST., MONTREAL, CANADA.

LA BELLE STEEL CO.,

Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa.

MANUFACTURERS OF ALL KINDS OF **STEEL** SPRINGS, AXLES, RAKE TEETH, Etc.

WETHERELL BROS., EASTERN REPRESENTATIVES, 31 Oliver St., Boston, and 93 Liberty St. N.Y.

RICE, LEWIS & SON, Toronto, Ont.

J. TATNALL LEA & CO.,

No. 125 So. Fourth St., Philadelphia.

**BESSEMER, MILL AND FOUNDRY PIG IRON,
MUCK BARS AND IRON ORES.**

W. Dewees Wood Co.,



MANUFACTURERS OF PATENT

PLANISHED SHEET IRON.

PATENTS:

Dec. 10th, 1878.	Mar. 4th, 1884.	Aug. 31st, 1886.
Jan. 10th, 1882.	April 15th, 1884.	Jan. 1st, 1889.
Jan. 1st, 1884.	June 10th, 1884.	Jan. 17th, 1893.
Feb. 12th, 1884.	Jan. 6th, 1886.	

Guaranteed fully equal, in all respects, to the Imported Russia Iron.

—ALSO—

Wood's Smooth Finished Sheet Irons and Sheet Steel, Cleaned and Free from Dust.

GENERAL OFFICES AND WORKS

McKeesport, Pa.

Branch Office: 111 Water Street, Pittsburgh, Pa.

Screws and Screw Making With a Chapter on the Milling Machine; a complete treatise on Screw Making in all its branches, embracing most recent methods and containing the reports which originated modern standard screw threads. With 95 illustrations. 12mo, cloth.....\$1.25
For Sale by David Williams, 96-102 Reade St., N.Y.

— SOHO IRON & STEEL WORKS —

MOORHEAD & McCLEANE CO.
MANUFACTURERS OF
PLATE IRON & STEEL.
GALVANIZED SHEET IRON
TRADE MARK
CHIB
PLATES, SPECIAL WIDE SHEETS AND EXTRA LONG SHELS IRONS
CORRUGATED & ROOFING IRONS
OFFICES AND WORKS,
PITTSBURGH.
EASTERN WAREHOUSE. No. 81 JOHN STREET, NEW YORK.
WESTERN WAREHOUSE. Nos. 16 & 18 W. LAKE ST. CHICAGO.

**Stay-Bolt,
Rivet, D. Link,
Axe, Hatchet,
Carriage and
Wagon Axle
IRON.**

Superior Quality Refined Bar Iron
"VULCAN" AND "LOCKHART" BRANDS.



SMALL CHANNELS AND ANGLES,
HEXAGON IRON AND STEEL.

**All
Merchant Bar
Sizes
of
Soft
STEEL.**

BETHLEHEM IRON COMPANY.

SOUTH BETHLEHEM, PENNA.

STEEL RAILS, BILLETS AND MUCK BAR, STEEL FORGINGS.

HOLLOW SHAFTING, CRANKS, ROLLS, GUNS AND ARMOR.
Rough, Machined or Finished, Fluid Compressed, Hydraulic Forged.NEW YORK OFFICE, - - - 80 BROADWAY.
PHILADELPHIA OFFICE, - - - 421 CHESTNUT ST.

THE S. OBERMAYER CO.,

Cincinnati, O., and Chicago, Ills.

—MANUFACTURERS OF—

FOUNDRY FACINGS, SUPPLIES and EQUIPMENTS

—IMPORTERS AND REFINERS OF—

East India Plumbago, Black Lead and Graphite.

Brass and Iron and Steel Foundries completely equipped.

General Catalogue sent on Application.

PASSAIC ROLLING MILL CO., Paterson, N. J.

—MANUFACTURE—

ROLLED STEEL or IRON BEAMS

Channels, Angles, Tees, Bars, Riveted Work, Forgings, Eye Bars, &c., &c.,

Also OPEN HEARTH STEEL BILLETS and SLABS.

NEW YORK OFFICE, - Rooms 151 and 152, No. 45 Broadway.

THE MONTGOMERY IRON & STEEL COMPANY,

DANVILLE, PA.



PIG IRON, T AND STREET RAILS,

Light Balls, 12 to 40 lbs. per yard.

RAIL JOINTS, SPIKES AND BAR IRON.

—ESTABLISHED 1850.—

ARCADE MALLEABLE IRON CO.

WARREN McFARLAND & CO.

Malleable Iron and Steel Castings,

WORCESTER, MASS.

Correspondence solicited. Prices given upon receipt of patterns or samples.

GEO. B. BUCKINGHAM.

THE GARTLAND FOUNDRY CO.,

—MANUFACTURERS OF—

Light Work our
Specialty.

Soft Grey Iron Castings.

We are prepared
to do Japanning and
Galvanizing.UNION and ECHO STS.,
Cleveland, Canton & Southern R. R.,

CLEVELAND, O.

RAIL.
BEAM.
BAR.

ROLLS

STRUCTURAL.
SPECIALS.
SHAPES.

EAST CHICAGO FOUNDRY COMPANY,

Office, 716 "The Rookery,"

CHICAGO.

"CATASAUQUA"

HIGH GRADE

Bars.

CATASAUQUA MFG. CO.

Charles K. Barns & Co., Agents,

224 South Fourth St., PHILADELPHIA.

L. & R. WISTER & CO.,

257 So. 4th St., Philadelphia.

Dunbar Foundry and Forge Irons.

Kemble Pig Iron.

Tuscarawas (Black Band).

Warner & Co's Wash Irons.

Dealers in all kinds of Scrap Iron and Steel.

HENRY LEVIS & CO.,**Manufacturers' Agents**For Iron and Steel Rails, Car Wheels, Boiler
and Sheet Iron and General

Railway Equipments.

Old Rails, Axles and Wheels bought and sold.

284 S. 4th St., Philadelphia.

Manhattan Rolling Mill.

JOHN LEONARD,

446 to 452 West St., New York.

MANUFACTURER OF

HORSE SHOE AND BAR IRON**BLACKSMITH SUPPLIES.**

OGDEN & WALLACE,

85, 87, 89 & 91 Elm St., New York.

IRON AND STEEL

Of every description kept in stock.

Agents for Park, Brother & Co.'s

BLACK DIAMOND STEEL.All sizes of Cast and Machinery Steel constantly
on hand.**WILLIAM H. WALLACE & CO.,**

IRON AND STEEL,

10, 12 and 14 ALBANY ST.,

and 131 WASHINGTON ST.,

NEW YORK.

Wm. H. Wallace. Wm. Bispham. E. C. Wallace.

THE MAHONING VALLEY IRON CO.

—MANUFACTURERS OF—

Bar, Band, Sheet, Plate and Tank Iron,
Angle Iron, Nails, Boat Spikes and Rivets,

YOUNGSTOWN, OHIO.

EXHAUST TUMBLERS,

Hexagon, Round or Wooden
BEST AND CHEAPEST.**WM. A. SWEETSER.**

39 Montello St., Brockton, Mass.

BIRMINGHAM IRON FOUNDRY,

BIRMINGHAM, CONN.

**CHILLED ROLLS AND ROLLING
MILL MACHINERY,
McCoy Patent Mill Pinions,
Shears, Rotary Squeezers.
WIRE DRAWING MACHINERY**

Special Rolling Machines for Gun Bar-
rels, Hoops, Pick and Axe Polls, Odd
Shapes and Tapers.

ESTABLISHED

1836

POWDER

—FOR—

Blasting, Mining and Sporting.
**ORANGE BRAND.
ELECTRIC BLASTING APPARATUS
SAFETY FUSE, &c.**

Send postal card for Illustrated Pamphlet
showing sizes grains Powder, and describing
Blasting Apparatus. Mailed **FREE**.

LAFLIN & RAND POWDER CO.,

New York Office, 29 Murray St.

DYNAMITE,**RED STAR BRAND****For Mining, Quarrying & Stump Blasting**

Safety Fuse, Caps, Platinum Fuse, Lead-
ing and Connecting Wire, with every other requis-
ite for Blasting Purposes. The especial atten-
tion of the hardware trade is invited to our
line of goods.

NEW YORK POWDER CO.,

62 Liberty St., New York.

Patent Tumbling Barrels.

MANY VARIETIES

For all Kinds of Work.

Send for new Catalogue.

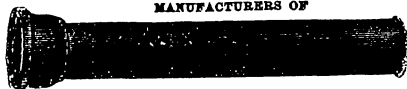
HENDERSON BROS., WATERBURY, CONN.

**S. CHENEY & SON,
GRAY IRON CASTINGS,**

**CHEAP HEATING STOVES,
DIAMOND THIMBLES.**

MANLIUS, N. Y.

**DONALDSON IRON COMPANY,
MANUFACTURERS OF**



CAST IRON PIPE
And Special Castings for Water and Gas. Also Flange Pipe
Eman, Lehigh Co., Pa.

FINE GRAY IRON

**FRANKLIN IRON FOUNDRY,
The Burr and Houston Company**

33-39 Franklin Street, Brooklyn (Green-
point), N. Y.

Special Attention Given to Fine Castings.
Telephone Call, Greenpoint 174

CHESS BROTHERS,

MANUFACTURERS OF A FULL LINE OF

SMALL CUT NAILS, TACKS, SHOE NAILS, ETC.

Always in stock. Special goods made to order.

SOFT STEEL PLATES.

Suitable for Implement manufacture and for all Blanking or Stamping uses,
of good surface, rolled carefully to gauges, ranging from No. 6 to 16, inclusive; in
widths up to 15½ inches and to multiples of lengths desired. Finished black or
scaled. And

EXPANDED METAL

In all its varieties of Fire-Proof Lath, Fencing, Tree Guards, &c. Send for catalogues
and prices.

Office, 531 Wood St., **PITTSBURGH, PA.**

GEORGE MESTA, Prest.

W. D. ROWAN, Sec.

J. O. HORNING, Treas.

LEECHBURG FOUNDRY & MACHINE CO.,

Office: LEWIS BLOCK, Pittsburgh, Pa.

Sheet and Bar Mills, Shears, Squeezers and Roll-Lathes
ROLLS. MESTA'S PATENT PICKLING MACHINES AND TIN
PLATE MACHINERY.

ESTIMATES GIVEN ON COMPLETE TIN PLATE PLANTS.

STANDARD FOUNDRY & MFG. CO., - CLEVELAND, OHIO.

—HEADQUARTERS FOR—

LIGHT GRAY IRON CASTINGS.

—UNEQUALED IN—

SOFTNESS and SUPERIOR FINISH.

Our Castings in finishing will save time and tools. We solicit a trial order knowing that we can
please you. Send samples for prices.

DYNAMOS

—FOR—

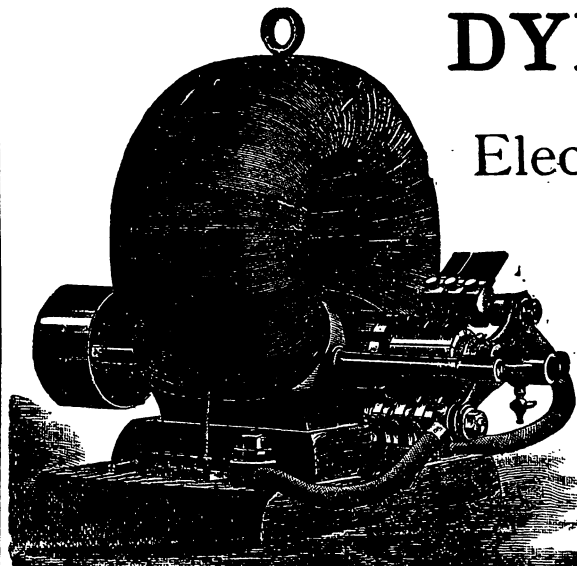
Electro-Plating.**SIMPLE,****DURABLE and****EFFICIENT.**

The Best Machine Made.
Satisfaction Guaranteed.

—THE—

Eddy Electric Mfg. Co.

Windsor, Conn.

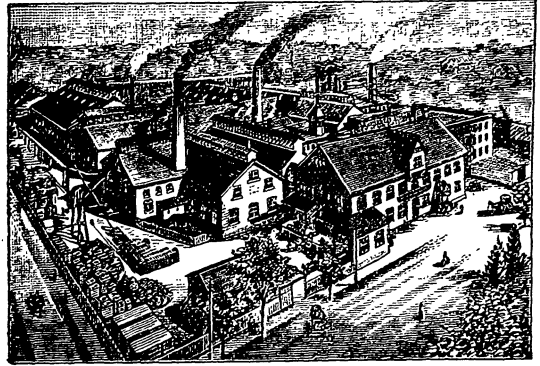
**BOOKS.**

YOU CAN OBTAIN PROMPTLY the latest
work on any subject in which you are
interested by addressing **DAVID WILL-**
IAMS, Publisher and Bookseller, 96-102 Reade Street, New York.

Sessions Foundry Co., BRISTOL, CONN. IRON CASTINGS TO ORDER.

We make small and large castings of all descriptions, of best quality, and at very low prices.

CORRESPONDENCE SOLICITED.



Soft Castings for Electrical Work and Sewing Machines. Fine Light Gray Iron Castings. Metal Patterns designed and made. Also Japanning and Galvanizing.

CLEVELAND, O.

STEEL CASTINGS

FROM 1 to 40,000 POUNDS WEIGHT,
Of Open Hearth, Chester or Bessemer Steel.
True to Pattern. Sound. Solid.
Gearing of all kinds, Crank Shafts, Knuckles for Car Couplers.
Cross-Heads, Rockers, Piston-Heads, etc., for Locomotives.
Steel Castings of Every Description.
Chester Steel Castings Co.
Works, Chester, Pa. Office, 407 Library St., Philadelphia, Pa.

THE ROBINSON-REA MFG. CO.,
PITTSBURGH, PA.

SAND & CHILLED ROLLS.
TIN PLATE PLANTS COMPLETE.
(No. 5.)

FOUND

RY Supplies of every description. The best quality, yet cheapest in price. Sole owners of "Radiant Facings."

THE J. D. SMITH FOUNDRY SUPPLY CO., Cincinnati, O.

DROP FORGING.

ESTIMATES GIVEN ON APPLICATION.
Sole Manufacturers of Ahlstrom's Patent Parallel Double
EXPANSION BOLTS,
also Single Expansion Bolts. Catalogues mailed on Application.

W. C. BOONE MFG. CO. - Office and Factory, - BOONTON, N. J.

JOHN M. SOLOMON, Successor to
WILMINGTON, DELAWARE. WOOD & CO.

Fire Clays for Iron and Steel Furnaces. Furnace Sand for Heating Furnaces. Pits directly on P. W. & B. R. R. Samples on application.

Cranes AND Derricks.

W. S. HALSEY & CO., - Birdsboro, Pa.

R. D. Wood & Co. 400 Chestnut St. PHILADELPHIA.

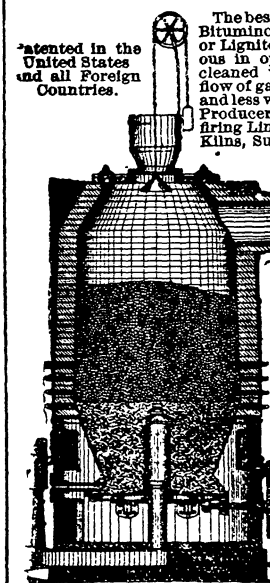
SOLE MAKERS OF THE

TAYLOR REVOLVING-BOTTOM GAS PRODUCER.

The best Producer for either Bituminous or Anthracite coal or Lignite; absolutely continuous in operation, as the fire is cleaned without stopping the flow of gas. Less labor required and less waste than in any other Producer. Producer Gas for firing Lime, Brick and Pottery Kilns, Sugar-house Char Kilns, Boilers, etc.

Patented in the United States and all Foreign Countries.

Also applicable to all Regenerative Furnaces. Send for Pamphlet.

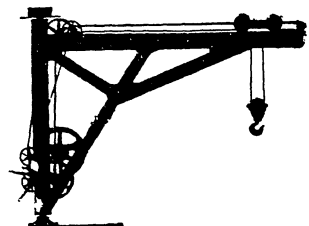


CAST IRON PIPE

MATHEWS' FIRE HYDRANTS
EDDY VALVES,
VALVE
INDICATOR POSTS.
Heavy Loam Castings
Special Machinery.
Water Power Pumps
and
TURBINES.

HYDRAULIC JIB and TRAVELING CRANES,
FREIGHT and CAR LIFTS, Etc.
GAS HOLDERS and GAS MACHINERY.

Detroit Foundry Equipment Co.



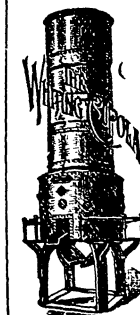
Cranes

THE WHITING CUPOLA.

Unequaled for Economy and Convenience.

LADLES, TRUCKS,
TUMBLERS,
SAND SIFTERS, &c., &c.

CHICAGO: 225 Dearborn Street.
DETROIT: Michigan Ave. & D. & B. C. Ry.



CYRUS BORGNER.
SUCCESSOR TO BORGNER & SONS
234 ST. ABOVE RACE PHILADA., PA. U.S.A.

FIRE BRICK
AND
CLAY RETORTS

MCLEOD & HENRY Co

FIRE BRICK

TROY, N.Y.

ESTABLISHED 1856.

HENRY MAURER & SON,
MANUFACTURERS OF
FIRE BRICK
of all Shapes and Sizes,
420 E. 23d St., New York.

B. KREISCHER & SONS,
FIRE BRICK

BEST AND CHEAPEST.

ESTABLISHED 1845.

Office, foot of Houston Street, East River, NEW YORK.

ESTABLISHED 1864.
JAMES GARDNER & SON,
MANUFACTURERS OF
"STANDARD SAVAGE" FIRE BRICK
TILE and FURNACE BLOCKS
OF ALL SHAPES AND SIZES.
WORKS, Ellerslie, Allegheny Co., Md.
OFFICE, Cumberland, Md., P. O. Box 540.

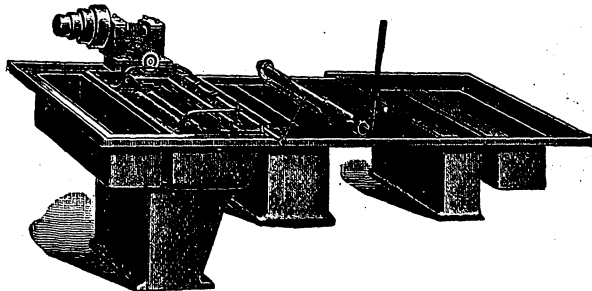
S. M. Hamilton & Co., Agents, - Baltimore, Md.
Stowe, Fuller & Co., Agents, - Cleveland, O.

Established 1848.

OSTRANDER FIRE BRICK CO.,
Manufacturers of
FIRE BRICK
FOR ALL PURPOSES.
TROY, N. Y.

A Trial will
Convince You
— THAT WE MAKE —
SOFT AND SMOOTH
Light Gray Iron Castings,
- - SOUND - -
Brass and Bronze Castings
TRUE TO THE PATTERN.
Also HAVE FACILITIES FOR FINISHING.
Sample for estimate solicited.
I. S. SPENCER'S SONS, Guilford, Conn.

M. D. VALENTINE & BRO -
FIRE BRICK
WOODBIDGE, N. J.

THE LLOYD BOOTH CO.,**YOUNGSTOWN, OHIO.**Tinning
MACHINERY.Rolling Mills,
Sand and Chill
ROLLS.

GRAY IRON, BRASS, ALUMINUM and ALUMINUM BRONZE CASTINGS
of the very best quality.

Very much time saved by using clean and soft castings. We use only the best material. A trial will convince you. PICKETS and ROSETTES for Wire Workers. Catalogue of same. NICKEL PLATING and JAPANNING, also METAL PATTERN MAKING and LIGHT MACHINE WORK. We invite correspondence.

HAIGHT & CLARK, - - ALBANY, N. Y.

DROP FORGINGS

OF EVERY DESCRIPTION, IN IRON, STEEL, COPPER and ALUMINUM.

Hoist Hooks, Shafting Collars, Eye
Bolts, Wrenches, Machine Hand-
les, Fence Ornaments.
SPECIAL ATTENTION GIVEN TO THE
MANUFACTURE OF

SPECIAL FORGINGS.

PHILADELPHIA DROP FORCE COMPANY,
Office and Works, S. E. Cor. American and York Sts., Philadelphia.
New York Agents: BATT, BONNELL & THOMPSON, 34 Dey Street, N. Y.

JOHN H. RICKETSON, Prest.

A. G. BARNETT, Treas.

W. L. RICKETSON, Supt.

O. G. RICKETSON, Vice-Prest.

A. G. McCLINTOCK, Sec'y.

A. GARRISON FOUNDRY CO.,
Manufacturers of Sand, Patent Homogeneous Steel and

CHILLED ROLLS.

Ore and Clay Pulverizers, Rotary Squeezers, Haskin's Patent Double Spiral Pinions and Rolling Mill Castings
of every description.

Office: Nos. 10 & 12 Wood St., - PITTSBURGH, PA.

WESTERN FOUNDRY COMPANY,
LIGHT GRAY IRON CASTINGS.

OFFICE: 813 Royal Insurance Building,

Chicago, Ill. Telephone, Main 559.

WORKS: Albany Ave., near 38th St.

Telephone, Yards 805.

Correspondence Solicited. We do Japanning, Galvanizing and Nickel Plating.

Haines Gauge Co.,
906 Filbert St.,
PHILADELPHIA,
PA., U. S. A.

The HAINES Automatic Micrometer Rolling
Mill GAUGE.
For reducing HOT WORK in process of rolling

BOOKS

THE NEWEST BOOKS ON Iron, Steel and Metallurgy
Mining, Mechanical and Civil Engineering; Casting and
Founding; Electricity and Electric Lighting, promptly
supplied on receipt of price by
DAVID WILLIAMS, 96-102 Reace St., New York.

Solid Steel TRETHEWEY MFG. CO., - 47th ST., PITTSBURGH, PA.

Shear Knives.

MANUFACTURERS OF

Tool Steel Dies of any size, Forgings of Machinery or Tool Steel, Rolling Mill Machinery, Steam Hammers, Squaring Shears, Double Headed Rotary Shears, Shear Grinding Machinery, Circle Cutting Machines, Roll Lathes, Hardened Forged Steel Rolls, Roll Turning Tools.

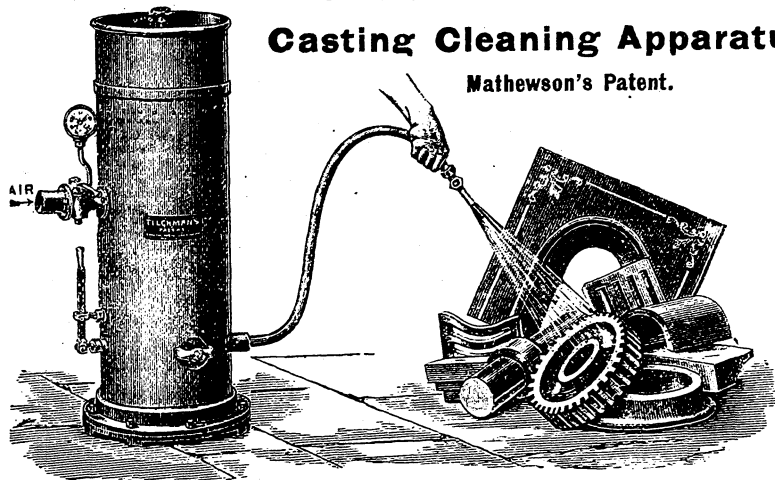
TILCHMAN'S PAT. SAND BLAST COMPANY, LTD.,

Casting Cleaning Apparatus

Mathewson's Patent.

SHEFFIELD, ENG.,

MANUFACTURERS OF



Patent Sand Blast Apparatus for sharpening and scouring files, cleaning steel, iron and brass castings, forgings, stampings, plates, &c.; also for obscuring, decorating and perforating all descriptions of glass, and cutting inscriptions and other designs on granite, marble and other stones.

THE S. R. SMYTHE COMPANY,

LEWIS BLOCK, ENGINEERS AND CONTRACTORS, PITTSBURGH, PA

Regenerative Gas Furnaces and Gas Producers For All Purposes.

TUBE, STEEL, ROLLING MILLS, GLASS WORKS CONSTRUCTION, Etc,

We contract for complete Plants, guarantee results and operation. OVER 100 PLANTS BUILT AND WORKING.

McAULEY FEED WATER HEATER AND PURIFIER. Clean Boilers Guaranteed at small cost. No scale, better service, and saving in fuel.

JULIAN KENNEDY.

Consulting and Contracting Engineer,

Rooms 36, 37, 38, 39 Vandergrift Building, Pittsburgh, Pa.

Blast Furnaces, Bessemer and Open Hearth Steel Works, Rolling Mills.

STEAM AND HYDRAULIC MACHINERY, &c.

—Branch Office of The Latrobe Steel Works.—

Wm. Swindell & Bros.,

ENGINEERS AND CONTRACTORS,

Regenerative and Recuperative Gas Furnaces for Steel, Iron and Glass.

SWINDELL'S IMPROVED GAS PRODUCERS,

243 BUILT SINCE APRIL 1, 1891.

P. O. Box 945.

548 Smithfield St., Pittsburgh, Pa



DROP FORGED

MERRILL BROS., 465 to 471 Kent Ave., Brooklyn, E.D., N. Y

Pennsylvania Diamond Drill & Manufacturing Co.

BIRDSBORO, PA.

Drill Press and Planer Chucks. Steam and Gas Engines. Diamond Pointed Core Prospecting Drills. Boiler Fronts and General Castings. Mineral Lands Prospected and Artesian Wells Bored by Contract.

CHICAGO MACHINERY & ENGINEERING CO., Western Sales Agents, Chicago,

ALEX LAUGHLIN & CO.

LEWIS BLOCK, PITTSBURGH, PA.

Gas Heating
Gas Puddling
Open Hearth
Crucible
Tube Welding

FURNACES

AND ARTIFICIAL GAS PRODUCERS OF EVERY DESCRIPTION, for ROLLING MILLS, STEEL AND TUBE WORKS.

We guarantee to place all Plants erected by us in successful operation

M. V. SMITH, PRES.
G. C. MORROW, SEC.

M. A. GREENE, VICE-PRES.
JOHN A. ELLIOTT, TREAS.

Artificial Gas Engineering Co.,

Consulting and Contracting

ENGINEERS.

ARTIFICIAL Gas applied to all Branches of Manufacturing and Domestic Uses. Apparatus for the Manufacture of Coal-Gas Furnished at Lowest Prices

706 TIMES BUILDING,
PITTSBURGH, PA.

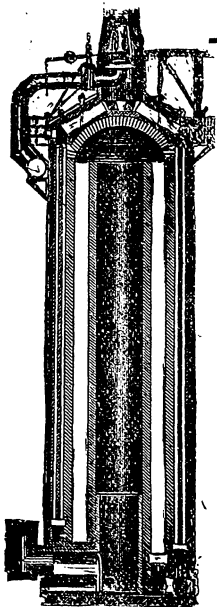
HENRY AIKEN,

Consulting Mechanical Engineer,

Rooms 203-206 Lewis Block,
PITTSBURGH, PA.

McCLURE, AMSLER & CO.

*Engineers and
Contractors*

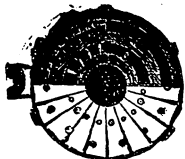


Bissell Block,
PITTSBURGH, PA.
**Blast Furnace
Construction**
A SPECIALTY.

Sole Agents for
MASSICK'S & CROOKE'S
PATENT

**Fire Brick
Stoves,**

Designs and Estimates
for the construction of
Blast Furnace Work,
and for all kinds of Hot
Blast Fire Brick or Pipe
Stoves; and all other kinds
of Brick Work pertaining
to Steel Plants, Iron, Brick
or Wooden Buildings, all
kinds of Iron Construction
in general.



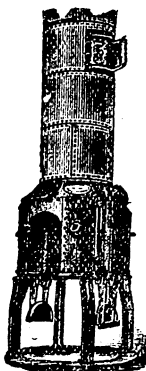
**We propose to put into successful
operation all the plants we design and
contract for.**

The Iron-Masters' LABORATORY

Exclusively for the
*Analysis of Ores of Iron, Pig and Manu-
factured Iron, Steels, Limestone, Clays,
Slags and Coal for Practical
Metallurgical Purposes.*

Branch Office, 339 Walnut St., Philadelphia.
All Analytical Work at Warrenton, Virginia
J. BLODGET BRITTON.

This laboratory was established in 1866, at the
instance of a number of practical Iron Masters,
expressly to afford prompt and reliable infor-
mation upon the chemical composition of the
substances above mentioned, for smelting and
refining purposes, the object being to make it
at once a convenient, practically useful, and
comparatively inexpensive adjunct to the Fur-
nace, Forge and Rolling Mill.



THE COLLIAU PATENT
Cupola Furnace

LEADS ALL OTHERS IN
**ECONOMY,
CAPACITY,
DURABILITY.**

Correspondence Solicited.
BYRAM & COMPANY,
Exclusive Manufacturers,
DETROIT. . . . MICH

**Electric Traction on Railways and Tram-
ways.** By A. BEEKENZAUN. The author has en-
deavored in this book to summarize as concisely as
possible the present state of electric traction and
to describe the various methods and constructive
details which are to-day in use or which have
marked consecutive steps in the development of
the art. 213 illustrations, 12mo, cloth, \$4.00
For sale by David Williams, 96-102 Reade St., N. Y.

JAMES HEMPHILL, President.
WM. H. CONLEY, Treasurer.

THOS. B. RITER Vice-President.
JNO. F. WILCOX, Gen'l Manager.

PITTSBURG IRON & STEEL ENGINEERING CO.

LEWIS BLOCK, PITTSBURGH, PA., U. S. A.

BESSEMER AND OPEN-HEARTH STEEL PLANTS.

Rolling Mills (Blooming, Rail, Plate, &c). Blast Furnaces, Engines
Boilers, Bridges, Girders, Iron Buildings.

WORKS BUILT COMPLETE and Fully Equipped for Operation.

THE D. R. LEAN COMPANY,
**Blast Furnace and
Steel Plant Construction,**

Penn Building, Pittsburgh, Pa.

J. A. HERRICK, M. E.,
Consulting Engineer and Contractor.
Room 609, 284 Pearl Street, NEW YORK.
— **STEEL CASTING PLANTS A SPECIALTY.** —
Melting and Heating Furnaces of ALL KINDS.
Patent Gas WATER VALVES. Improved "BASIC" and "SEMI-
STEEL" Processes and FURNACES.
New CONTINUOUS Gas PRODUCERS.

Corliss Steam Engines,

Simple, Compound and Triple
Expansion, Condensing and
Non-Condensing.

Tanks and Stand Pipes.

Feed Water Heaters.

Steel Plate Chimneys.

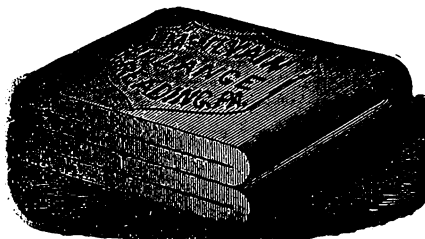
Air Pumps and Condensers.

Philadelphia Engineering Works,
LIMITED,

Fliffin Street, East of Front Street, Philadelphia, Pa.

Long Distance Telephone, 1781.

TENSILE
STRAIN. } 56,000 to 64,000 lbs.



CAPACITY. { Plates 1 inch thick to No. 12.
30 feet long.
70 inches wide.

WM. McILVAIN & SONS,
READING, PA.,

MANUFACTURERS OF

**IRON AND STEEL
BOILER PLATES.**

Locomotive, Fire Box, Flange, Shell,
Tank Iron and Steel, including Plates for
Bridges, Girders, Stacks, Pipe and Fire
and Burglar-proof Safes.

THE ALLENTOWN ROLLING MILLS,

MANUFACTURERS OF

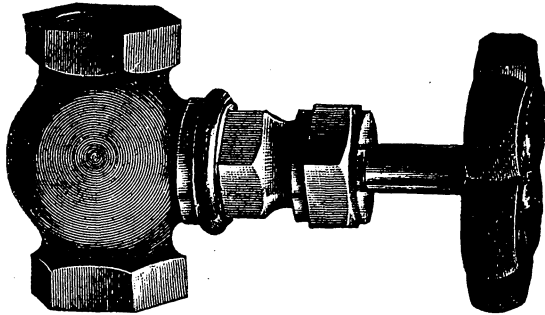
Pig Iron, Merchant Bar Iron, Rolled Shafting, Mine Rails, I-Beams, Tee Bars, Fish
Plates, Bolts, Nuts and Spikes.

Transfer and Locomotive Turn Tables, Blast Furnace, Rolling Mill and Mining Ma-
chinery, Mining Pumps, Etc. Roll Trains, Shears, Punches, Iron Trucks, Etc. Builders
of all classes of Machinery. Makers of Castings of all descriptions for Cable and
Electric Railway. ALLENTOWN, PA.

**BLAST FURNACES,
ROLLING MILLS,
STEEL WORKS,
MINES, ETC.,
ETC.**



**OIL WELLS,
REFINERIES,
ELECTRIC LIGHT PLANTS
WATER WORKS, ETC.,
ETC.**



McNAB & HARLIN MFG. CO.,

—MANUFACTURERS OF—

BRASS COCKS AND VALVES

For Steam, Water and Gas.

Wrought Iron Pipe and Fittings. Plumbers' Materials. Seamless Brass and Copper Tubes.

Factory, PATERSON, N. J.

56 JOHN ST., N. Y.

Catalogue and Price-List will be sent to the Trade with their first order, or by express, if desired, before ordering.



THE CONTINENTAL IRON WORKS

West and Calyer Streets, BROOKLYN, N. Y.,

—SOLE MANUFACTURERS OF—

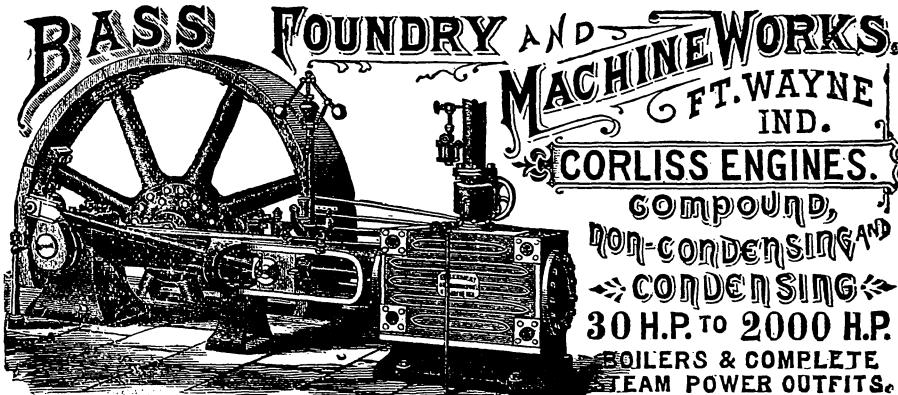
CORRUGATED FURNACES, FOR MARINE AND LAND BOILERS.

Made in sizes from 28 in. to 60 in. diameter, with flanged or plain ends.

Thos. F. Rowland, Pres.
Thos. F. Rowland, Jr., Treas.

Warren E. Hill,
Chas. H. Corbett, } Vice-Pres.

Take Ferry from East 10th or 23d Streets, N. Y., to Greenpoint.



BASS FOUNDRY AND MACHINE WORKS.

FT. WAYNE
IND.

CORLISS ENGINES.

Compound,
Non-condensing and
Condensing
30 H.P. TO 2000 H.P.
BOILERS & COMPLETE
STEAM POWER OUTFITS.

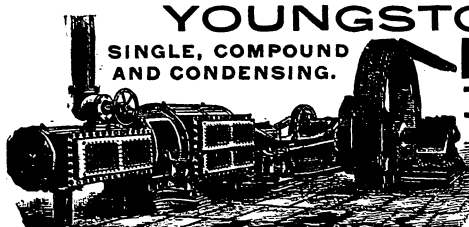
WILLIAM TOD & CO.

YOUNGSTOWN, OHIO.

SINGLE, COMPOUND
AND CONDENSING.

**PORTER-HAMILTON
ENGINE**

Blowing Engines,
Hydraulic Cranes & Accumulators
Heavy Special Machinery.
ENGINE CATALOGUE ON APPLICATION.



The Improved
**WHARTON - HARRISON
SAFETY BOILER,**

For all Power and Heating Purposes.
Single Boilers 2-240 H.-P.
Batteries of any Capacity.

**THE COCHRANE
FEEDWATER HEATER.**

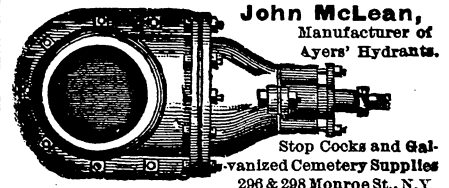
**THE COCHRANE
FEEDWATER HEATER & PURIFIER.**

THE COCHRANE
SEPARATOR.

Horizontal or Vertical Form. For Obtaining
Dry Steam. Purified Exhaust.

FOR PARTICULARS ADDRESS

Harrison Safety Boiler Wks.,
Germantown Junction. PHILADELPHIA, PA.



John McLean,
Manufacturer of
Ayers' Hydrants.

Stop Cocks and Gal-
vanized Cemetery Supplies
296 & 298 Monroe St., N.Y.

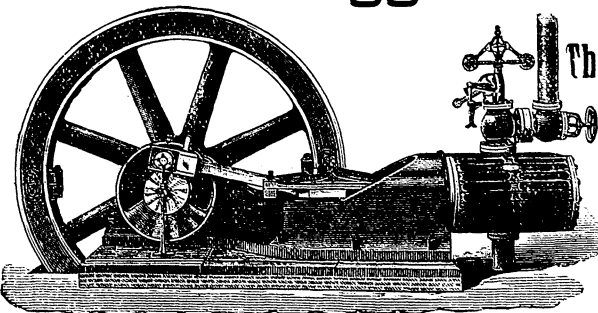
Totten & Hogg I. & S. F'dry Co.,

Manufacturers of

The "Aetna" Rolling Mill

ENGINE

Chilled and Sand
Rolls and Rolling Mill
Machinery,
PITTSBURGH, PA.



BOSTON GEAR WORKS

37 Hartford St., Boston, Mass.

HEADQUARTERS FOR GEARS.

Book on Gears, 170 Illustrations, \$1.00. Job Gear
Cutting of all kinds. Spur, Bevel, Spiral, Ratchet,
Worm, Rack, Elliptic, Index Plates, &c. Very small
or large. Send for 1892 Catalogue; 900 sizes of Gears
FREE to any business firm.

ESTABLISHED 1870. INCORPORATED 1893.

ERIE ENGINE WORKS

(CLEVELAND & HARDWICK.)

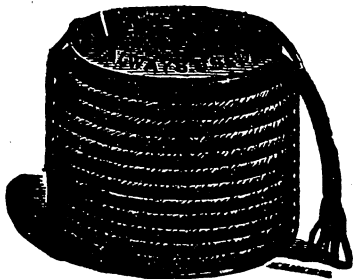


ERIE, PA.

Manufacturers of

STEAM ENGINES AND BOILERS.

ROLLASON GAS ENGINES
RELIABLE AND ECONOMICAL
Send for Catalogue, etc. HAVEMEYER BLDG. NEW YORK



Send for a Sample of
Morrison's Patent Self-Lubricating Packing,
ROBT. MORRISON,
5034 Arsenal St., St. Louis, Mo

CHAPMAN VALVE MFG. CO.

Manufacturers of

VALVES & GATES

For Water, Steam, Gas, Ammonia, &c.

GATE FIRE HYDRANTS,

With and without independent outlets.



We make a specialty of Valves with Bronze seats for High Pressure steam.
Works and General Office,

INDIAN ORCHARD, MASS.
Treasurer's Office,

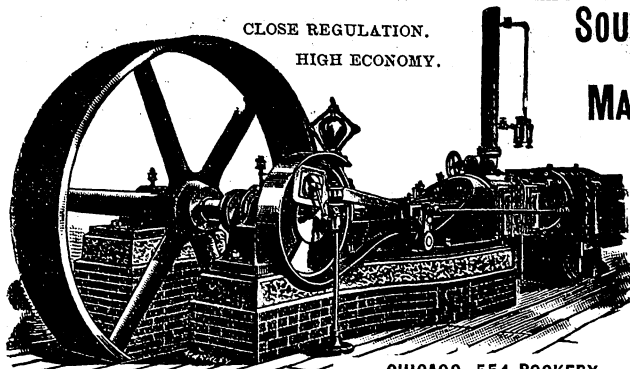
72 Kilby and 112 Milk Streets,

Boston, Mass.

Chicago Office, 24 West Lake St. New York Office, 28 Platt Street.



SEND FOR CATALOGUE "A."

CLOSE REGULATION.
HIGH ECONOMY.CHICAGO, 554 ROOKERY.
ST. LOUIS, 32 LACLEDE BLDG.

SOUTHWARK FOUNDRY

- AND -

MACHINE COMPANY,

Philadelphia, Pa.

Sole Makers of

**THE PORTER-ALLEN;
AUTOMATIC ENGINE,**

SIMPLE, COMPOUND
OR TRIPLE EXPANSION.

Also Builders of

**BLOWING ENGINES,
REVERSING ENGINES,
CENTRIFUGAL PUMPS,
BOILERS, TANKS, ETC.**



ARE universally known,
used, adopted and speci-
fied where always the
best is wanted.

ALWAYS as represented.**ALWAYS** reliable.**ALWAYS** satisfactory.

We could tell more, but
this space is valuable.
You had better send for
our catalogue of superior
Steam Specialties, and
get posted.

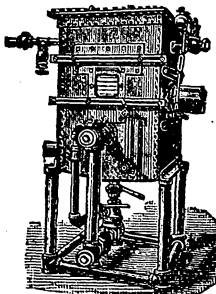
All goods marked "LUNKENHEIMER" are warranted. You make no mistake by adopting them, if you want the best. If you order from your dealer specify and insist on our make.

THE LUNKENHEIMER COMPANY,

CINCINNATI, O., U. S. A.

WE GUARANTEE YOU

a very considerable saving in the items of water and fuel by the use of our **Vacuum Feed Water Heater and Purifier**, and this means, of course, an extra profit on your output. The "how" will be found in a comprehensive Catalogue, which is yours for the asking, also Catalogues of the **Webster Separator** and **William's Vacuum System of Steam Heating**.



WARREN WEBSTER & Co.,

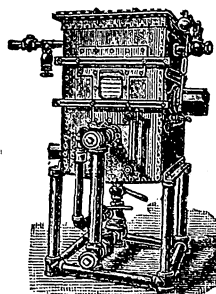
NEW YORK, 126 Liberty Street.
CHICAGO, Monadnock Building.

No. 2.

CAMDEN, N. J.

WE NEVER SOLD ONE

of our **Vacuum Feed Water Heaters and Purifiers** until we had first satisfied our customer that it was capable of saving money for him. Our Catalogue will make this saving clear to you. Shall we mail it? We also build the **Webster Separator** and **William's Vacuum System of Steam Heating**.



WARREN WEBSTER & Co.,

NEW YORK, 126 Liberty Street.
CHICAGO, Monadnock Building.

No. 8.

CAMDEN, N. J.

BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS**, Publisher and Bookseller, 96-102 Reade Street, New York.



THOROUGH INSPECTIONS

And Insurance against loss or damage to property and loss of life and injury to persons caused by

Steam Boiler Explosions

J. M. ALLEN, Pres. WM. B. FRANKLIN, Vice-Pres. F. B. ALLEN, 2d Vice-Pres. J. B. PIERCE, Sec. and Treas.

BOARD OF DIRECTORS:

J. M. ALLEN, President.
 FRANK W. CHENEY, of Cheney Brothers Silk Manufacturing Co.
 CHARLES M. BEACH, of Beach & Co.
 DANIEL PHILLIPS, of Adams Express Company.
 RICHARD W. H. JARVIS, President Colt's Fire Arms Manufacturing Co.
 THOMAS O. ENDERS, of the United States Bank.
 LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.
 GEN. WM. B. FRANKLIN, late Vice-President Colt's Pat. Fire Arms Mfg. Co.
 NELSON HOLLISTER, of the State Bank, Hartford.

HON. HENRY C. ROBINSON, Attorney at Law, Hartford.
 HON. FRANCIS B. COOLEY, of the National Exchange Bank, Hartford, Conn.
 A. W. JILLSON, late Vice-Prest. Phoenix Fire Insurance Co., Hartford, Conn.
 EDMUND A. STEADMAN, President of the Fidelity Co., Hartford, Conn.
 GEORGE BURNHAM, Baldwin Locomotive Works, Philadelphia.
 HON. NATHANIEL SHIPMAN, Judge U. S. Circuit Court.
 C. C. KIMBALL, Prest. Smythe Manufacturing Co., Hartford, Conn.
 PHILIP CORBIN, of P. & F. Corbin, New Britain, Conn.

THE EYNON-EVANS MANUFACTURING CO.,

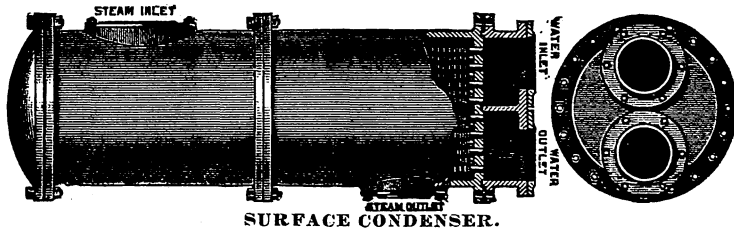
Patentees and Manufacturers of **THE EYNON-KORTING COMPOUND INJECTORS.**

Extra Heavy Globe and Angle Valves.  **Brass Castings up to 5000 lbs.**

Blowers, Ventilators, Blast Nozzles, Exhausters, Brass Syphons, Acid Syphons, Condensers.

Fifteenth and Clearfield Sts., Philadelphia, Pa.

The WAINWRIGHT FEED WATER HEATER



is a straight corrugated copper tube heater, and is making a record which its competitors find hard to beat. Send for the whole story to

THE TAUNTON LOCOMOTIVE MFG. CO.,
 TAUNTON, MASS.

The C. & C. ELECTRIC COMPANY

ARE PREPARED TO FURNISH

MULTIPOLAR DYNAMOS, DIRECT DRIVEN OR BELTED,
 IN SIZES UP TO 250 H.-P.

Bipolar Dynamos up to 100 H.-P. Electric Motors, Automatic or Hand Controlled.
 Complete Plants for Power Transmisson. Isolated Lighting Plants.
 Central Station Apparatus.

General Office, 143 Liberty St., New York. Works, Garwood, N. J., on Central R. R. of N. J.

BRANCH OFFICES: CHICAGO, 201 Madison Street. BOSTON, 63 Oliver Street. CLEVELAND, Cuyahoga Building. PHILADELPHIA, 633 Arch Street.

NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN

\$100

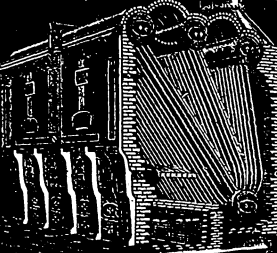
Per thousand words is what Robt. Louis Stevenson gets for his stories. The difference twixt Bob and us is that we pay more than that to *The Iron Age* for the privilege of writing; but here is method in this extravagance, it all comes back. Have we ever had anything from you? Do you know that BONNELL'S NUBIAN IRON ENAMEL is the best black on earth for all Iron Work? Write us just a postal card and get our story and the next issue of our quarterly calendar.

77 Warren St., New York, N. Y.
 Hall & Carpenter, Philadelphia.
 Taylor Goodrich, San Francisco.

THE NUBIAN IRON ENAMEL CO.,

33-35 Nubian Ave.,
 CRAGIN, ILL.

NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN



SAFE. EFFICIENT.
ECONOMICAL.
DURABLE.
PRACTICALLY
SELF-CLEANING.
NO CAST METAL.

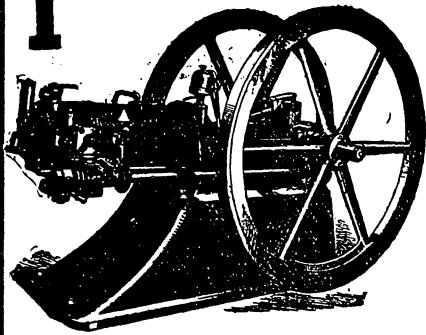
NO FLAT SURFACES.
NO STAY BOLTS.
REMOVAL OF FOUR
MANHOLE PLATES
GIVES ACCESS TO
EVERY PART.

THE STIRLING WATER TUBE SAFETY BOILER.

74 Cortlandt St., New York.
418 Walnut St., Phila.
Cuyahoga Building, Cleveland.

THE STIRLING CO.,
Gen'l Offices, Pullman Building,
CHICAGO, ILL.

POWER FROM GASOLINE.



DIRECT FROM THE TANK.

CHEAPER THAN STEAM No Boiler. No Steam. No Engineer.

FOR USE EVERYWHERE.

OTTO GASOLINE ENGINES, Stationary or Portable.

1 to 50 H. P. 8 to 20 H. P.

Running Expenses, Less than one cent per horse power per hour. For large engines, one-half cent per horse power per hour. Suitable for all manufacturing purposes, Electric Lighting, Town Water Supply. The Best Auxiliary Power for Night Work.

OTTO GAS ENGINE WORKS,

33d and Walnut Sts., PHILADELPHIA, PA.

CHICAGO OFFICE: 245 Lake St.

BOSTON OFFICE: 19 Pearl St.

THE AMERICAN FEED WATER HEATER

Received the First Prize at the

Mechanics' Association Fair, - Boston, Mass.

What you get when you buy the AMERICAN HEATERS:

COPPER COILS,
SOLIDLY BRAZED,
GUN METAL FITTINGS
AND CLAMP STAYS,
STEEL SHELLS,

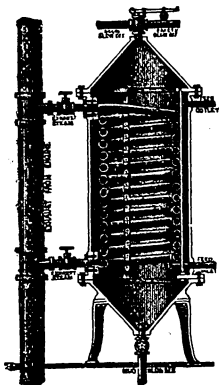
NO RUSTING OUT,
NO LEAKY JOINTS,
NO TROUBLE FROM EXPANSION,
NO BACK PRESSURE,
NO OIL IN BOILER.

We guarantee this Heater to be the Most Durable, Effective and Cheapest

WHITLOCK COIL PIPE CO.,

27 South Street,

Elmwood, Conn.

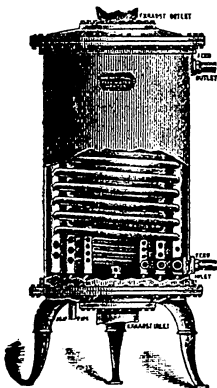


The National Feed Water Heater

is a BRASS COIL HEATER, delivering water to the boilers at 212° Fahrenheit. It is low in price, but unequalled in efficiency. 500,000 H. P. in daily use attests its merits.

Coils and Bends of Iron, Brass, and Copper Pipe.

THE NATIONAL PIPE BENDING CO.,
98 River St., New Haven, Conn.



Ladd's Discount Book

Price, \$3.00; Double Indexed Edition, \$4.00. Sent postpaid upon receipt of price, by

DAVID WILLIAMS, Bookseller and Publisher, - - - - - 96-102 Reade Street, New York.

Awarded the Grand Prize at Late Paris Exposition.

SEND FOR THIS BOOK
FREE ON APPLICATION.

BABCOCK & WILCOX CO.
ST. N.Y.

WATER TUBE

STEAMBOILERS

MANUFACTORIES IN UNITED STATES, SCOTLAND, FRANCE, GERMANY & AUSTRIA.

Branch Offices:
BOSTON, MASS. 8 OLIVER ST.
PHILADELPHIA, PA. 32 N. 5TH ST.
PITTSBURGH, PA. 408 LEWIS BLOCK
CLEVELAND, O. 412 PERRY-PAYNE BLDG.
CHICAGO, ILL. 45 S. JEFFERSON ST.
MINNEAPOLIS, MINN. 604 CORN EX.
NEW ORLEANS, LA. 57 CARondelet ST.
HAYANA, CUBA. 116 CALLE DELA HABANA.

R. POOLE & SON CO.
ENGINEERS, FOUNDERS and MACHINISTS.
BALTIMORE, MD.

MANUFACTURERS AND DESIGNERS OF ALL KINDS OF
HEAVY MACHINERY,
REQUIRING FIRST CLASS WORKMANSHIP AND MATERIALS.

BAND, ROPE and FLY WHEELS, FRICTION CLUTCHES, SHAFTING, PULLEYS and HANGERS.

MACHINE MOLDED AND PLANED GEARING.

MACHINERY FOR WHITE LEAD and FERTILIZER WORKS,
GRAIN ELEVATORS and FLOUR MILLS, BRASS, COPPER
and TIN PLATE ROLLING MILLS, CABLE and MARINE RAILWAYS.
POOLE-LEFFEL TURBINE WATER WHEELS.
DREDGING MACHINES.
CIRCULARS ON APPLICATION.
IRON CASTINGS OF 30,000 LBS. TENSILE STRENGTH.

RAND DRILL COMPANY.

We were Awarded the Highest Premium at the WORLD'S COLUMBIAN EXPOSITION on the following:

DUPLEX COMPOUND STEAM AND COMPOUND AIR COMPRESSOR,
AT MACHINERY HALL.

And the following, exhibited at Mines and Mining Building:

High Pressure Compressor, Straight Line Compressor,
Little Giant Rock Drill, Slugger Rock Drill,
Furnace Tapping Drill, Shaft Bar,
Column, Derby Bit, and

Award on Collective Exhibit of Compressors and Drills.

RAND DRILL CO., - 23 Park Place, N. Y

THE GOUBERT
FEED-WATER HEATER
IS THE BEST

WRITE FOR CATALOGUE AND PRICES

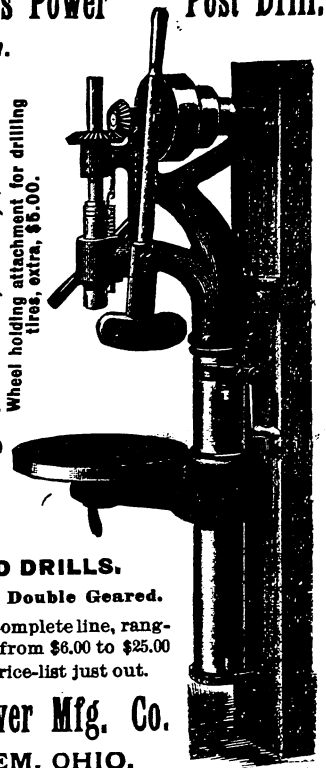
14 & 16 CHURCH ST.
COR. CORTLANDT.
NEW YORK.

Silver's Power Post Drill.

FIG. 727.

Has CUT GRANKS, and is a thoroughly first-class tool in all respects. Dia. Column, 4 in.; Dia. Spindle, 1 3/4 in.; and bored No. 2 Morse Taper; Vertical Travel, 6 in.; Drills to centre 19 in. circle.

Weight, 325 lbs.; Price, \$60.00.
Wheel holding attachment for drilling tires, extra, \$6.00.



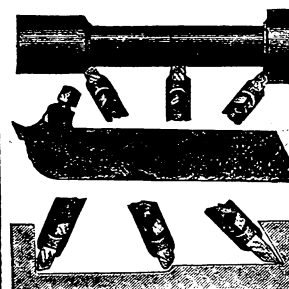
HAND DRILLS.

Single and Double Geared.

Large and complete line, ranging in price from \$6.00 to \$25.00 list. New price-list just out.

The Silver Mfg. Co.

SALEM, OHIO.



The Armstrong Tool Holder.

For General Lathe and Planer Work. A practical substitute for Forged Tools. Saves forging, dressing and tempering, 70 per cent. grinding, 90 per cent. too steel. Over 10,000 now in use by such firms as J. A. Fay & Egan Co., Frick Co., Morris Machine Works, W. P. Callahan & Co., Walburn & Co.,

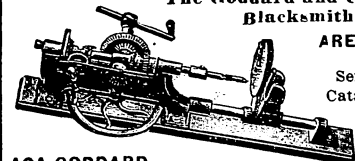
Patented February 28, 1893.

Swenson Co., Fitchburg Machine Works, Lodge & Shipley Machine Tool Co., and many other large concerns. Seven Sizes, suitable for all kinds of work. Tools sent on trial to responsible parties. Manufactured only by Armstrong Bros. Tool Co., 76-78 Edge-wood Ave., Chicago.

The Goddard and Columbia Blacksmiths' Drills

ARE THE BEST.

Send for Catalogue.



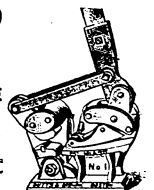
ASA GODDARD,
Manufacturer,
Worcester, Mass.

B. & O. SURE GRIP TIRE UPSETTER.

IT IS WITHOUT A FAULT. ONE MOTION DOES IT ALL.

Every machine is tested, and warranted. Send for Price.

HUTTS & ORDWAY,
500 Atlantic Ave., Boston, Mass.

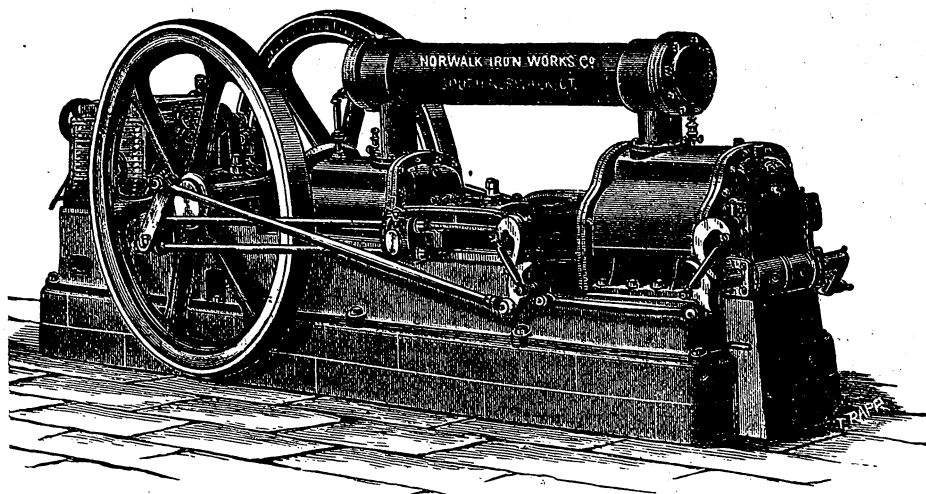


VULCAN IRON WORKS
CHICAGO
PILE DRIVERS

Vagaries of Sanitary Science. By F. L. DIBBLE, M.D. The author claims that the whole sanitary movement thus far has no resemblance to scientific investigation. Much sanitary nonsense has been foisted on the people. He submits investigations on air, water, soil, sewer gas, cemeteries, public funerals, meat, milk, filth and fecal diseases, typhoid fever, yellow fever, cholera, diphtheria, epidemics, boards of health and vital statistics. His purpose is to show the true nature of diseases and the means of avoiding them scientifically. 1893. 462 pages, cloth. \$2.00

For Sale by DAVID WILLIAMS, 96 102 Reade St., N.Y.

Air Compressors.

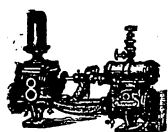


THE NORWALK IRON WORKS CO., South Norwalk, Conn.

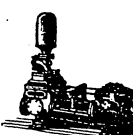


**CHEAPEST.
HANDIEST.
SIMPLEST.**

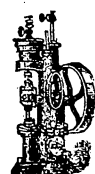
PUMPS.
Handling Dirty, Gritty and Sandy Liquids without Wear, Oil or Care. Pumping out for Contractors, Mining, Irrigating, Railroad Quarry, Drainage and Manufacturing purposes. Second-hand Engines, Boilers, Pumps, and other Machinery always on hand. Exchanging
MASLINS, 165-167 First St. Jersey City, N. J.



Send
for
Prices.



VALLEY PUMP CO.
Easthampton, Mass.



The Metal Worker's Handy-Book OF RECEIPTS AND PROCESSES,

BEING A COLLECTION OF CHEMICAL FORMULAS AND PRACTICAL MANIPULATIONS FOR THE WORKING OF ALL THE METALS AND ALLOYS, INCLUDING THE DECORATION AND BEAUTIFYING OF ARTICLES MANUFACTURED THEREFROM, AS WELL AS THEIR PRESERVATION.

Edited from Various Sources by

WILLIAM T. BRANNT.

500 Pages, Cloth, \$2.50.

THE TECHNO-CHEMICAL RECEIPT BOOK.

CONTAINING

SEVERAL THOUSAND RECEIPTS, COVERING THE LATEST MOST IMPORTANT AND MOST USEFUL DISCOVERIES IN CHEMICAL TECHNOLOGY, AND THEIR PRACTICAL APPLICATION IN THE ARTS AND THE INDUSTRIES.

Edited from the German with Additions by

WILLIAM T. BRANNT.

495 Pages, Cloth, \$2.00.

Sent post-paid on receipt of price, by

DAVID WILLIAMS, Publisher & Bookseller,

96-102 Reade St., New York.

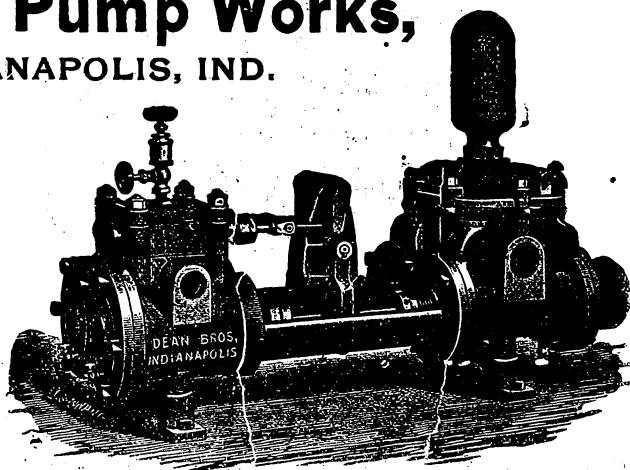
DEAN BROTHERS' Steam Pump Works, INDIANAPOLIS, IND.

DUPLEX PUMPS.

SINGLE PUMPS.

**DEEP WELL
PUMPS.**

Send for Catalogue
and Prices.



The JOHN H. MCGOWAN CO.

PUMPS FOR EVERY SERVICE

CINCINNATI, OHIO.

FACTORY OFFICE 46 CENTRAL AVE.

PRICE LIST ON APPLICATION

Brass Founders and Mfrs. of every description of Brass and Iron body goods for steam, gas and water.

Branch House: 1425 E. Main St., Richmond, Va.

Worthington Steam Pumps CONDENSERS and WATER METERS.

HENRY R. WORTHINGTON,

86 & 88 LIBERTY STREET, NEW YORK.

BOSTON,

PHILADELPHIA,

CHICAGO,

ST. LOUIS,

DENVER.

The WATERBURY-FARREL FOUNDRY & MACHINE CO., Waterbury, Connecticut,

Builders of Rolling Mill Machinery, Special Machines for finishing and making goods from Sheet Brass, Copper, Steel, Silver, &c., **POWER PRESSES, HYDRAULIC PRESSES,** Drop Presses, Foot Presses, **RIVET MACHINES,** Gang Slitters, Grinding Machines, Steel Rolls, Wire Mill Machinery, Tube Drawing Machinery, Dies, &c.

The Brown Hoisting and Conveying Machine Co.,

CLEVELAND, OHIO, U. S. A.,

Sole manufacturers of the

"BROWN HOIST"

A NEW AND COMPLETE SYSTEM FOR HANDLING OF MATERIALS.

The Brown Patent Cable Tramway system.

The Brown Patent Suspended Beam Tramway system.

The Brown Patent Bridge Tramway system.

The Brown Patent Shed Tramway system.

The Brown Patent Furnace Stock Distributer.

The Brown Patent Warehouse Tramway system.

The Brown Patent Sewer Machine Tramway system.

The Brown Patent Continuous Elevated Tramway system.

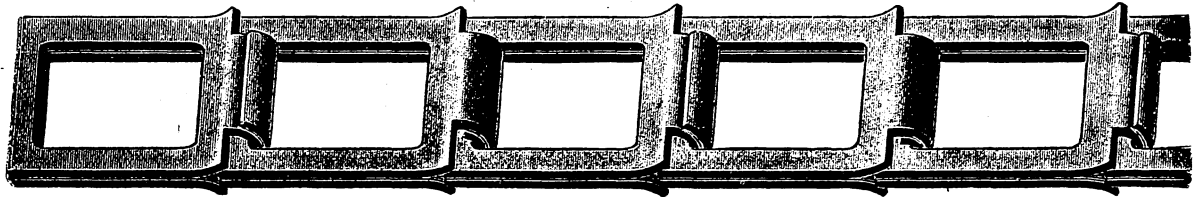
The Fayette-Brown Patent Automatic Furnace Hoist.

The Brown Patent Friction Clutch Hoisting Engine.

Self-Dumping Buckets, Skip Cars, Friction Clutches, etc.

The Most Perfect Clutch.

ROBERTS MFG. CO. - - - PITTSBURGH, PA.



PATENT DETACHABLE STEEL LINK BELTING,

Sprocket Wheels and Shafting.

Send for Catalogue and Price-List.

JEFFREY CHAIN BELTING.

Also MALLEABLE, WROUGHT, STEEL AND SPECIAL CHAINS for

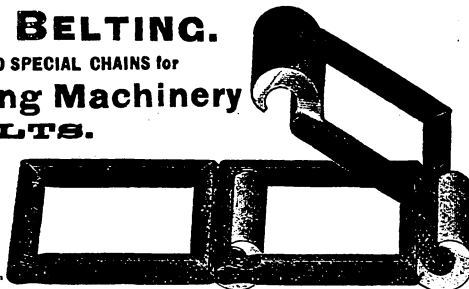
Elevating and Conveying Machinery

DRIVE BELTS.

Send for Illustrated Catalogue and Reduced Price-List.

THE JEFFREY MANUFACTURING CO
COLUMBUS, OHIO, U. S. A.

New York Branch, 163 Washington St.



ALEXANDER BROS. BEST OAK BELTING.

PHILADELPHIA.

Patterson, Gottfried & Hunter, Limited, agents,
146-150 Centre St., New York, N. Y.

PITTSBURGH MFG. CO.,

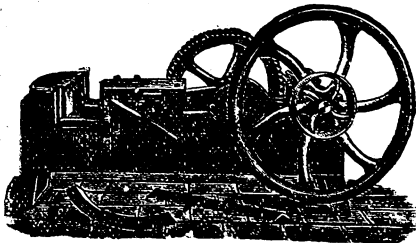
Manufacturers of

Crosgrove's Patent Straight-
ening, Bending and Punch-
ing Machines.

NAIL MACHINERY.

Bolts, Nuts, Rivets, Castings, &c.

PITTSBURGH - - PA.



DURANT COUNTING MACHINES

Received the Highest Award at the
World's Columbian Exposition.Send for
Catalogue
to

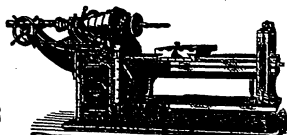
W. N. DURANT, 234 22d St., Milwaukee, Wis

FITCHBURG MACHINE WORKS,

MANUFACTURERS OF THE CELEBRATED

FITCHBURG

AND OTHER

Horizontal Boring and Drilling
Machine.

ENGINE LATHE

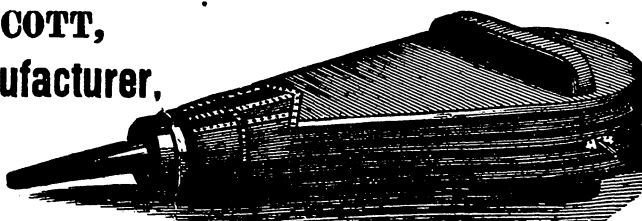
METAL-WORKING MACHINES.

FITCHBURG,
MASS.SEND FOR
CATALOGUE B.GEO. M. SCOTT,
Bellows Manufacturer,

Johnson Street

Cor. 22d St.,

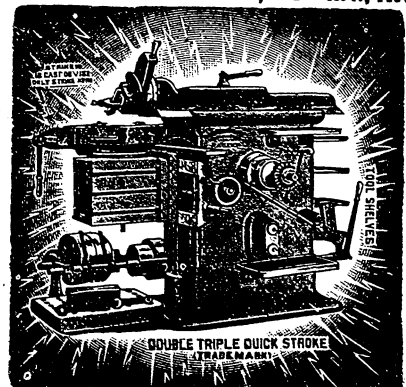
CHICAGO, ILL.



FOR THE "Double Triple Quick Stroke" SHAPER

WRITE TO

GOULD & EBERHARDT, Newark, N.J.



12 in. 16 in., 20 in., 24 in., 28 in., 30 in. stroke.

LEVIATHAN BELTING.

Positively unequalled for Strength, Durability and Traction Power; unaffected by Heat, Steam or Water.

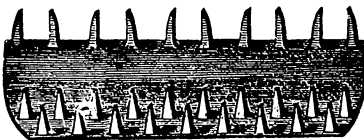
Belts for Main Driving and work of a heavy nature a specialty.

MAIN BELTING COMPANY,

Sole Manufacturers,
1219-1235 Carpenter St.
PHILADELPHIA.

248 Randolph Street, Chicago.
120 Pearl Street, Boston

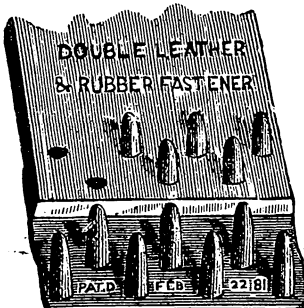
Send for Price-Lists and Samples.

Talcott's Combination Belt Hooks

W. O. TALCOTT, Providence, R. I.
MANUFACTURER OF

Four Styles of BELT HOOKS, Including 134 Sizes
SEND FOR CATALOGUE.

Thacher's Patent BELT FASTENERS.



Manufactured by The Claffen Manufacturing Co.
Cleveland, O. Office, 71 and 73 Ontario St.

A Word On Lubrication.

The development of high speed and great power machinery of the day has made the question of successful lubrication more serious than ever before. The compound engines, the great motors, the heavy shaft lines and gears, now so common in the large power plants and mills, present many new questions of friction and lubrication.

With superheated steam and high pressure there is difficulty in properly lubricating steam cylinders and valves.

Under these conditions pure flake Graphite has solved so very many of the problems that it would seem to be the key to solve many others. A prominent engineer once said, "The more solid the lubricant that can be used in any place, the better the lubrication."

The difference between a perfectly pure Graphite and one almost pure, but still totally unfit for lubricating, cannot be detected by either sight or touch; the buyer's only guarantee of the purity is the name and reputation of a responsible manufacturer.

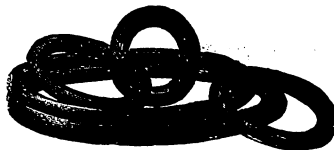
The two conditions of success, so far as Graphite in engine or general lubrication is concerned, are: the Graphite must be absolutely pure and free from grit, and the flake of uniform size.

An exceedingly interesting pamphlet on Graphite Lubrication is sent free of charge by the

JOS. DIXON CRUCIBLE CO., Jersey City, N. J.

H. O. CANFIELD,

MOULDED BRIDGEPORT, CONN.



Small moulded work a specialty. Send for estimates for moulds and work.
RUBBER GOODS FOR MECHANICAL PURPOSES.



J. A. FAY & CO.,
288 to 308 W. Front St., Cincinnati, Ohio, U. S. A.

ORIGINATORS, INTRODUCERS AND CONSTRUCTORS OF
WOOD-WORKING MACHINERY
Of Every Description.

We captured all the "Honors" at the World's Fair for superiority.

Machines for any Want Supplied.
Largest Line in the World.

NEW YORK BELTING & PACKING CO. LTD

OLDEST, LARGEST and BEST Makers of

Rubber Goods

FOR MECHANICAL USES.



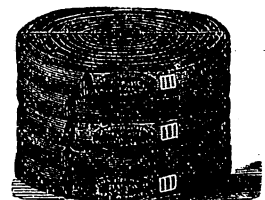
Rubber belting, hose, steam hose, brewer's hose, suction hose, "Test" fire hose, cotton hose, packing, valves, gaskets, rings, vulcanite emery wheels, rubber covered rolls, tubing, rubber cement, mats, matting, stair treads, bicycle and vehicle tires, car springs, fruit jar rings, etc. Special goods to order.



Send for Catalogue.

PIONEERS AND LEADERS.

15 Park Row, New York.



STORES: Boston, Philadelphia, Chicago, Cincinnati, Minneapolis, Cleveland, San Francisco, Detroit, Baltimore, Charleston, New Orleans, Kansas City, St. Louis, Dallas.

AGENTS WANTED IN UNOCCUPIED TERRITORY.

E. W. BLISS CO.,

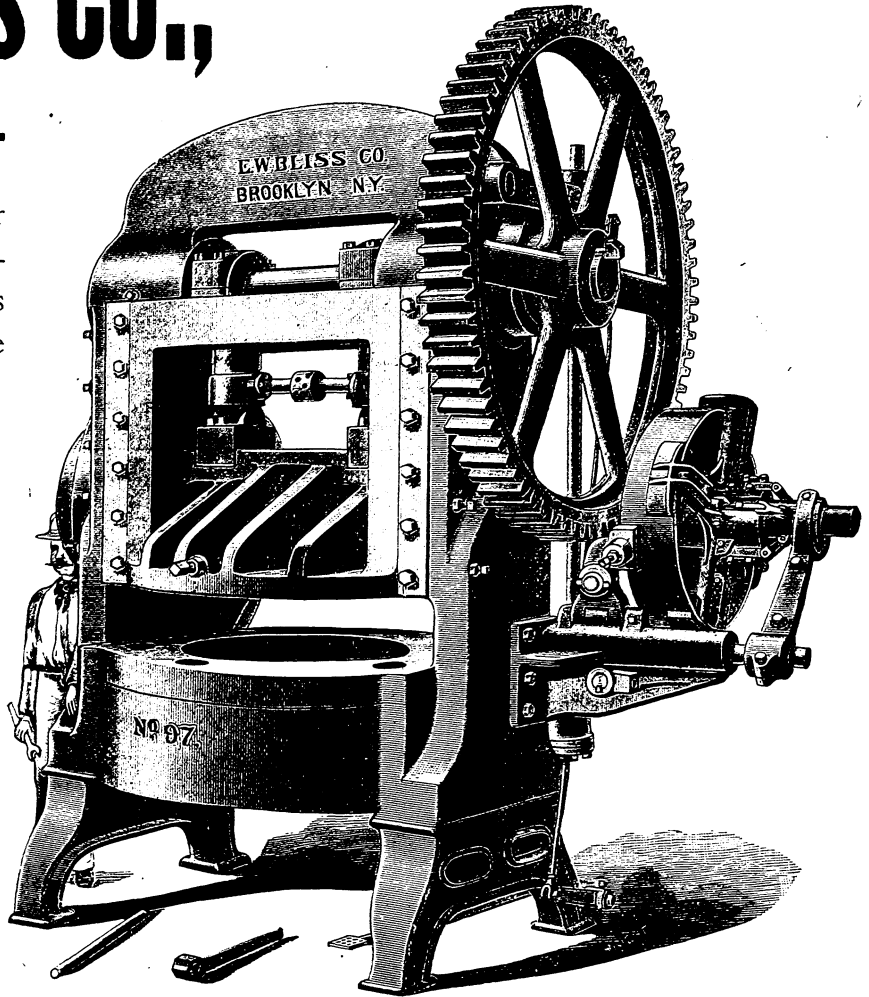
WESTERN OFFICE, 14 N. CANAL ST., CHICAGO.

11 ADAMS ST., BROOKLYN. N. Y.

These presses are intended for operating large and accurate cutting and perforating dies, such as armature rings, etc. They are made in a number of sizes.

**PRESSES,
PUNCHES,
SHEARS,
DROP
HAMMERS,
DIES
AND
SPECIAL
MACHINERY.**

The Stiles & Parker Press Co.



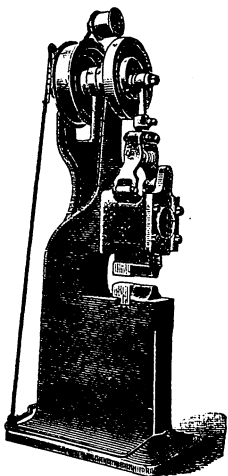
The Dupont Power Hammer STANDS FIRST

IN

{ Simplicity of Adjustment,
Simplicity of Construction,
Economy of Power,
Economy of Space,
Durability,

And costs less than any hammer built. Send for our new descriptive circular to

**The Dupont Manufacturing Co.,
ST. JOHNSBURY, VT.**



The Dupont Power Hammer.

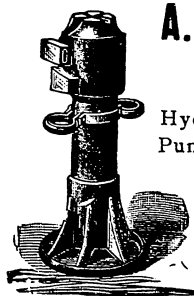
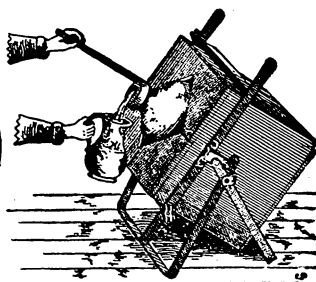


STAR LOCK WORKS, PHILA.

HILLEBRAND & WOLF,

MANUFACTURERS OF
1ST QUALITY ONLY
SCANDINAVIAN
AND
SPRING PADLOCKS

TRUNK & CASE LOCKS
CARBOY STANDS, &c.
CATALOGUES SENT ON APPLICATION



A. L. HENDERER,
Wilmington, Del.

MANUFACTURER OF

Hydraulic Jacks, Hydraulic
Punches, Screw Punches,
Steel Tube Expand-
ers, Flue Hole Cut-
ters, Boiler Test
Pumps and Pipe
Vises.

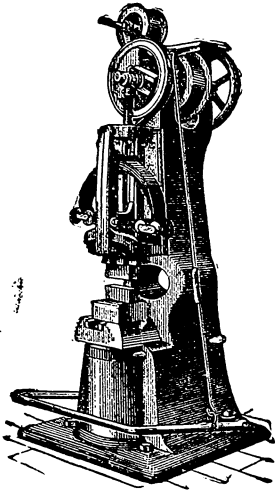
RIEHLE

BROS. TESTING MACHINE CO., Phila., have issued a new describing and illustrating all the various styles of their U. S. Standard Testing Machinery with the special appliances. Marble Machinery, Rope Twisters, Loam Mills, Riehle-Roble Frictionless Ball Screw Jacks, Iron and Wooden Trucks, &c., &c., are described. It is desired to have one of these Catalogues in the office of every Superintendent, Purchasing Agent, Engineer or Manufacturer using such Machinery. A copy will be mailed free of charge to those who may apply.

CAT. No. 3

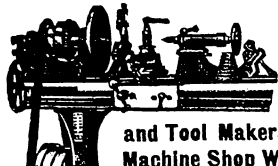
If You Use Power Hammers

Write to us for Circulars.
SCRANTON & CO.,
NEW HAVEN, CONN.



Chicago Office, 65 South Canal Street.

FOOT POWER LATHES,



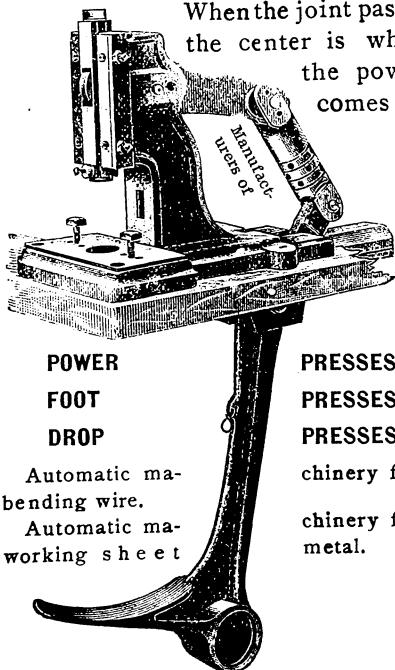
For Electrical and Experimental work.
For Gunsmiths and Tool Makers. For General Machine Shop Work.

High grade tools; elegant in design, superior in construction. The best foot power lathes made, and quality considered the cheapest. Discounts to the Hardware and Machinery trade, quoted on application. Send for Catalogue and Price-List.

W. F. & JNO. BARNES CO.,
69 Ruby Street, ROCKFORD, ILL.
ENGLISH AGENTS, CHAS. CHURCHILL & CO.,
21 Cross St., Finsbury, E. C., London.

Cross & Speirs Machine Co.,

When the joint passes
the center is when
the power
comes in.



POWER
FOOT
DROP

Automatic ma-
bending wire.
Automatic ma-
working sheet

PRESSES.
PRESSES.
PRESSES.
chinery for
chinery for
metal.

31 TO 37 CANAL STREET,
WATERBURY, CONN.

Handbook of Ornament. By FRANZ SALES MEYER.
A grammar of art industrial and architectural de-
signing in all its branches, for practical as well as
theoretical use. Authorized English edition. 580
pages, illustrated, cloth..... \$3.00
For Sale by David Williams, 96-102 Reade St., N. Y.

LINK-BELT

ENGINEERING CO
NICETOWN,
PHILA
49 DEY ST.
NEW YORK

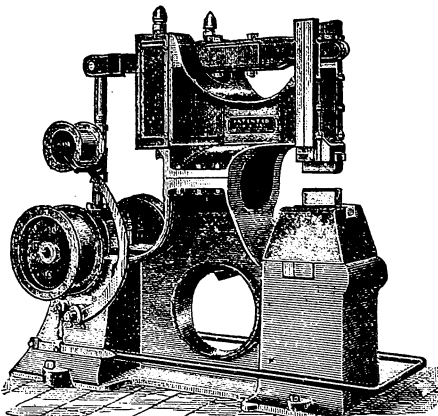
Elevators, Conveyors, Manila Rope Power Transmission Machinery, Ewart Detachable Link Belting, Dodge Chain, Howe Chain, &c.

General Eastern Agents for Fibre-Graphite Journal Bearings for shafting and machines. Require no oil or other lubricant. Moderate in price, durable and guaranteed. Bearings furnished to fit hangers now in use.

WESTERN CONNECTION

(CHICAGO,) LINK BELT MACHINERY CO.

JENKINS' POWER HAMMERS.



Adjustable and elastic stroke, nicety of regulation, efficiency of action, simplicity and durability of construction and the absence of leather straps, steel springs and all complication, combine to make this hammer the favorite wherever used.

JENKINS & LINGLE,
BELLEFONTE, PA.

Presses of all kinds for

SHEET METAL WARE.

Wiring, Blanking and Combination
Dies a Specialty.

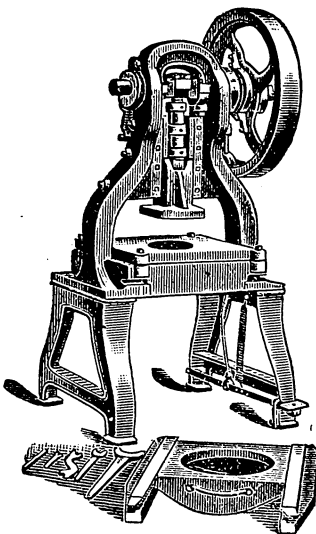
Just out. Special new machinery

FOR MAKING ROUND, SQUARE AND

CORRUGATED CONDUCTOR PIPE

In 10 Feet Lengths.

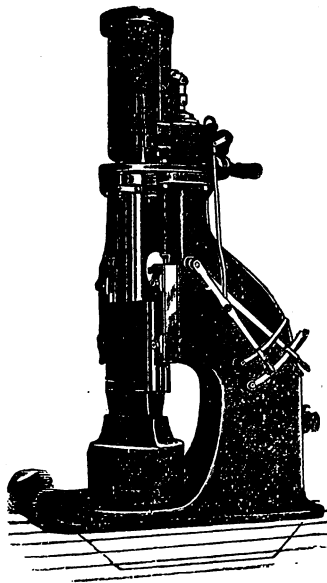
WILL TURN OUT 10,000 FEET PER DAY.



Stark Machine & Tool Co.,
BUFFALO, N. Y.

G. A. CROS
Manufacture
PRESSE
SPECIAL MA
SHEET METAL
176 178 So. Clinton

BY CO.
rs of
S. DIES
CHINERY
WORKERS
St., Chicago, Ill.



Bement, Miles & Co.,

PHILADELPHIA, PA.,

Builders of

Metal-Working Machine Tools

For railroad shops, locomotive and car builders,
machine shops, steam forges, shipyards, boiler
shops, bridge works

**Steam Hammers for Working Iron
or Steel.**

NEW YORK OFFICE. Equitable Building.

GEORGE PLACE, Agent.

THE STURTEVANT IMPROVED PORTABLE FORGES.

PRESSURE BLOWERS,

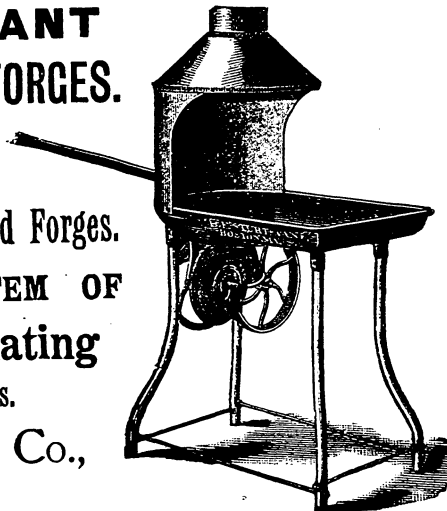
For Cupola Furnaces and Forges.

THE STURTEVANT SYSTEM OF
Heating and Ventilating
Manufacturing Establishments.

B. F. STURTEVANT Co.,
BOSTON, MASS.

91 Liberty Street, New York;

16 South Canal St., Chicago.



135 North Third St.,
Philadelphia.

IF YOU WANT ANYTHING IN THE LINE OF
**DROP PRESSES · DROP HAMMERS ·
STAMPS OR AUTOMATIC
DROP LIFTERS**

SEND FOR CATALOGUE TO

Miner & Peck Mfg. Co.
New Haven, Conn.
LARGEST LINE IN THE MARKET.

Engravings Show the Style of Die
Head which the

Bignall & Keeler Mfg. Co.,

ST. LOUIS, MO.,

PLACE ON THEIR

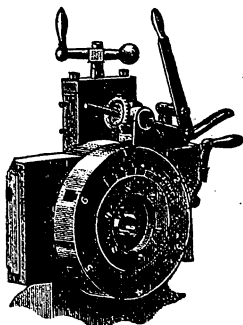
PEERLESS AND DUPLEX

Pipe Threading & Cutting Machines.

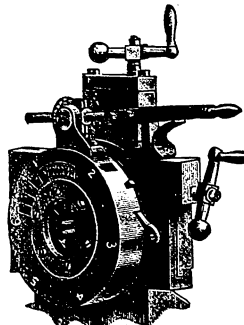
Write for Prices on the

Most Perfect and Economical Line
of Machines on the Market.

Mention *The Iron Age*.



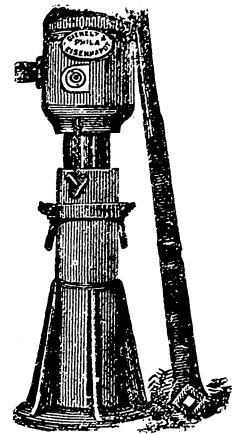
"Peerless" Head showing
dies expanded.



"Peerless" Head showing
dies closed.

RELIANCE HYDRAULIC JACKS.

SUPERIOR TO ANY JACK NOW MADE.
Absolute in its actions in any position.
Under complete and instantaneous control.



MADE IN FOUR SIZES,
10, 15, 20 and 30-ton capacity, to lift 12 or
18 inches. Broad Base or Ground Lift.

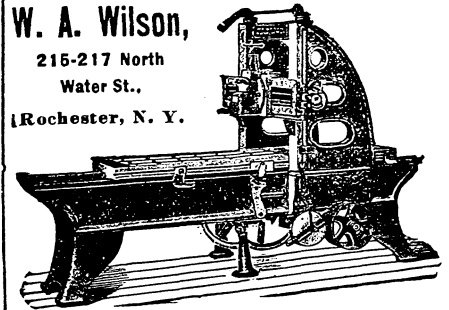
**DIENELT & EISENHARDT,
MAKERS,**

1308 Howard Street, Philadelphia.

W. A. Wilson,

215-217 North
Water St.,

Rochester, N. Y.



Improved Iron Planers a specialty. 20 x 20, 22 x 22,
24 x 24 up to 42 x 42, to plane any length. Send for
description and price-list before purchasing. Manu-
facturers' agent for other tools and machinery. Men-
tion *The Iron Age*.

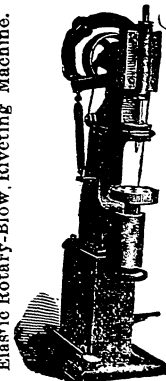
JOHN ADT & SON,

New Haven, Conn.,

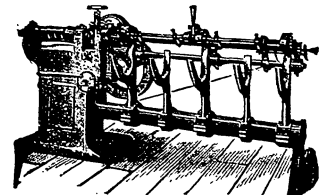
BUILDERS OF

MACHINERY FOR HARDWARE MANUFACTURE.

Elastic Rotary-Blow Riveting Machine.



Butt Milling
Machinery.
Butt Drilling
Machinery.
Riveting
Machines.
Wire Straightening
Machinery.
Foot Presses,
Sprue Cutters,
Etc.



Automatic Wire Straightening and Cutting Machine

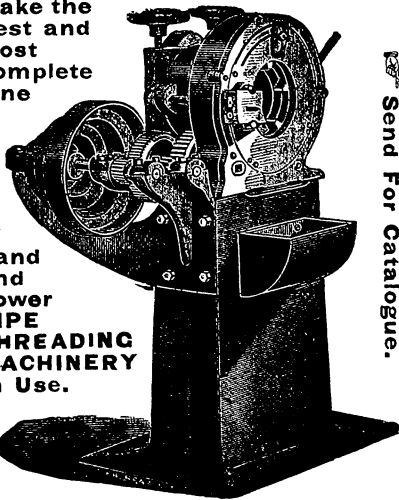
Pumps and Pumping Machinery. Part 1 By
FREDERICK COLYER, M. Institute C. E. Second edi-
tion, revised and enlarged. Synopsis of contents:
Lift Pumps.—Driving gear. Beer, tar, vinegar,
sewage and well pumps, &c. Force pumps, va-
rious kinds. General details of lift and force
pumps. Arrangement of engine and pumps. Depth
of suction, water towers, &c. Sundry pumps.—
Centrifugal, drainage and dock pumps, chain
pumps, air pumps, blowing engines and compres-
sors. Engines for working pumps. Horizontal high-
pressure engines. Compound engines. Vertical
engines. Quadruple-expansion engines. Data of
working results, &c. &c. Cornish engines. Beam
and bull engines. Fuel consumed. Boilers, verti-
cal, cylindrical, Cornish, Lancashire, multitubular,
patent water tube boilers, &c. Engine houses, de-
tails of construction, fittings for rooms, &c. Boiler
houses. Index. 200 pages. 53 large folding plates
to scale. Cloth, 8vo. \$10.00

For sale by David Williams, 96-102 Reade St., N. Y.

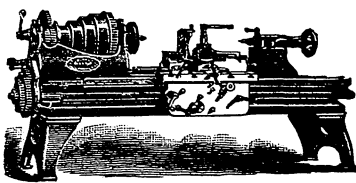
The Merrill Manufacturing Co.,
Toledo, Ohio,

Make the
Best and
Most
Complete
Line

of
Hand
and
Power
PIPE
THREADING
MACHINERY
in Use.



Send For Catalogue.



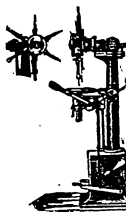
NEW HAVEN MANUFACTURING CO.

NEW HAVEN, CONN.

Manufacturers of

IRON-WORKING MACHINERY

Planers, Shapers, Drills, Slotters, Etc.



QUINT'S TURRET DRILLS.

Six Spindle.

Drills from 1-32 to 1/4 hole. Speed from 250 to 2000 rev.

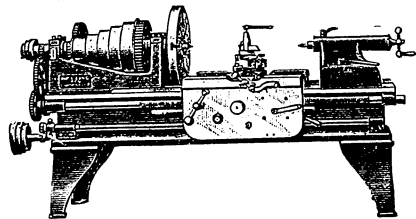
Suitable for a large variety of work and is operated with ease and rapidity.

SEND FOR CIRCULAR.

A. D. QUINT, Hartford, Conn.

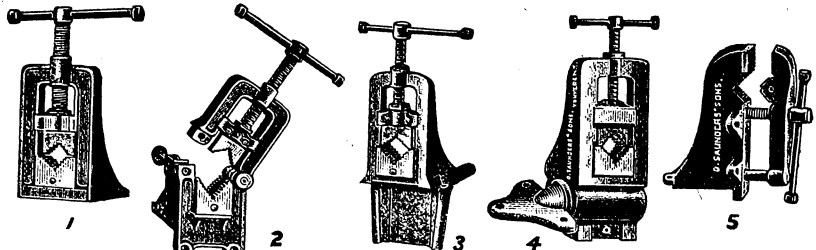
22 inch and 24 inch furnished in lengths of 8, 10, 12, 14 and 16 feet bed.

WITH ALL MODERN IMPROVEMENTS.



D. SAUNDERS' SONS,

Manufacturers of Improved



PIPE VISES

of all styles and sizes holding 1/4 in. to 8 in. pipe, made of MALLEABLE IRON, CAST IRON and STEEL. Also PIPE THREADING MACHINES 1/4 in. to 16 in., Hand Pipe Cutters, Stocks and Dies, Tapping Machines, etc. Send for catalogue to

27 Atherton Street, Yonkers, N. Y.

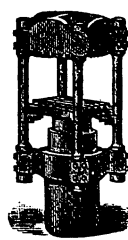
HYDRAULIC PRESSES and PUMPS FOR ALL PURPOSES.



Plain Press

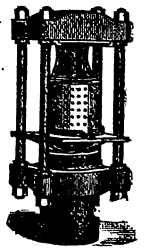
Baling Presses,
Oil Presses,
Embossing Presses,
Die Presses,
Belt Presses,
Frame Benders,
Riveting Presses,
And all other Presses.

WATSON & STILLMAN



Forging Press.

Hand Pumps,
Belt Pumps,
Steam Pumps,
Automatic Pumps,
Variable Delivery
Pumps,
And over 50 varieties
of Hydraulic Pumps.
Accumulators, Valves,
Gauges, Fittings, &c.
204-210 East 43d
St., N. Y.



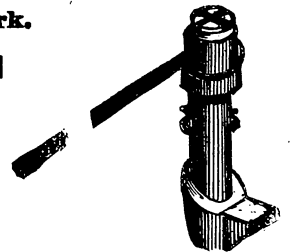
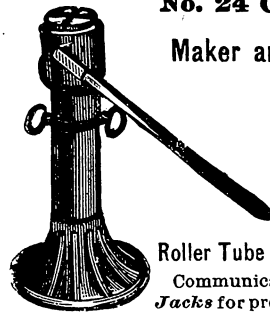
Curb Press.

RICHARD DUDGEON,

No. 24 Columbia Street, New York.

Maker and Patentee of the Improved

**Hydraulic Jacks
AND
Punches.**



Roller Tube Expanders and Direct Acting Steam Hammers

Communication by letter will receive prompt attention.

Jacks for pressing on Car Wheels or Crank Pins made to order.

Eng. Lathes.

**Our Patent
Radial Drills.**

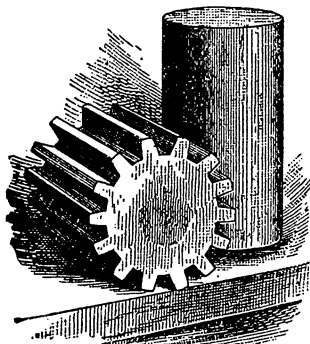
When you want to do anything that requires Radial Drilling Machinery you want a tool that will save time, consequently money and labor. You do this with

Dietz, Schumacher & Co.,
Cincinnati, Ohio, U. S. A.

Heavy Drawn Steel Work

Of Every Description.

Including Shapes for Centrifugals, Bottles for confining Gases, Chemicals, Quicksilver, etc., Heavy Tubing for Knitting Machines, Hydraulic Jacks and Presses, Air and Gas Receivers drawn from solid steel or plates, Straps, Wrists, Pins, Discs, Cups, Steel Flanges for high pressure steam, Drawn Seamless Steel Tubing for Bicycles, Boilers, including small diameter Tubing for use as hollow spindles, etc., etc.

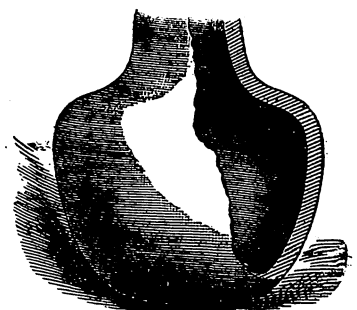


Billet and Patent Hot-Pressed Steel Pinion

Hot
Pressed
Pinions.

THE UNITED STATES PROJECTILE CO.,

1st Ave. and 53rd St., Brooklyn, N. Y.

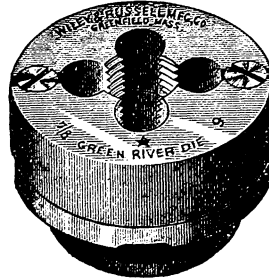
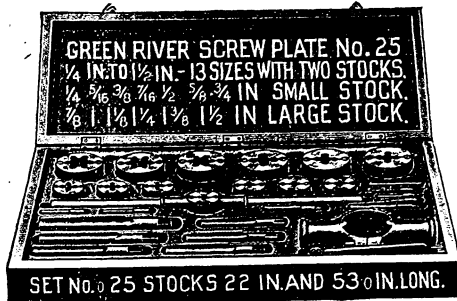


Steel Bottles, any thickness or shape.

Hydraulic
Forgings.

CELEBRATED GREEN RIVER SCREW PLATES. SIGOURNEY DRILLS.

Send for 168 Page Catalogue.



WILEY & RUSSELL MFG. CO.,

Greenfield, Mass., U. S. A.

New York Agency for Wiley & Russell, 114 Liberty St.

Maule's "Skeleton" Pipe Die

Two "Points" about it—only 2 (There are plenty more, but we only mention these two here.)

1

The First Cost to you of MAULE'S "SKELETON" PIPE DIE is less than that of any other Pipe-Threading Die—and

2

Before it becomes dull from use it will cut as many perfect threads as the best solid die extant, and when it is dull, you don't throw it away and buy a new one—Oh, no! You simply sharpen the cutters on a common grindstone, and so make it practically as good as it was at first, and this sharpening process may be repeated a number of times.

A sample One-inch "Skeleton" Pipe Die either $2\frac{3}{8}$ or $2\frac{1}{2} \times \frac{3}{4}$ thick, by mail, postage prepaid, will cost you 62 cents, and will be sent upon receipt of a Postal note for that amount.

DO NOT SEND US ANY POSTAGE STAMPS.

You may return such sample to us, at our expense, if, after seeing it, you do not consider it worth the price. Don't the above sound as if it might save you some money—if TRUE?

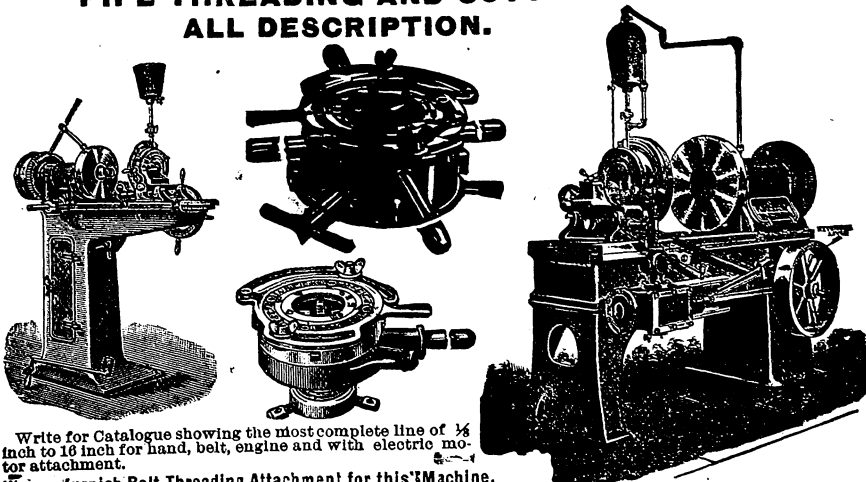
HENRY B. PANCOAST & CO.,

243-245 South 3d Street, Philadelphia, U. S. A.

ASK YOUR JOBBER WHAT HE KNOWS ABOUT THIS TOOL.

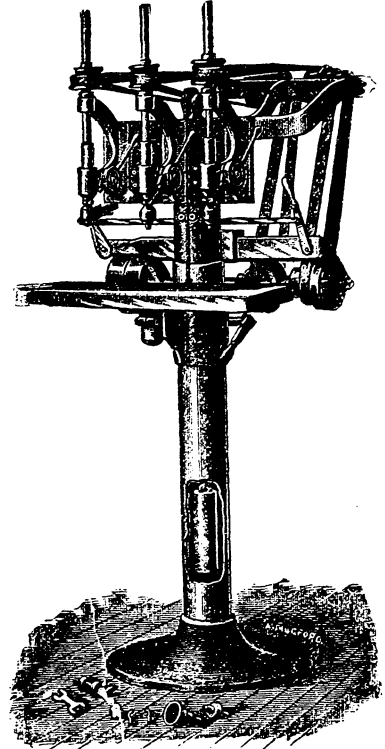
JARECKI MFG. CO. (Limited), Erie, Pa

PIPE THREADING AND CUTTING TOOLS OF ALL DESCRIPTION.



Write for Catalogue showing the most complete line of $\frac{1}{4}$ inch to 18 inch hand, belt, engine and with electric motor attachment. We can furnish Bolt Threading Attachment for this Machine.

IMPROVED.



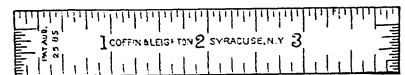
Sensitive, Strong and Interchangeable

One, Two and Three Spindles.

Counter-balanced Spindles and Tables. Vertical range of table, 30 inches, and it will swing to right or left.

SEND FOR CIRCULAR.

THE SIGOURNEY TOOL CO.,
Hartford, Conn.



MACHINISTS' SCALES,
PATENT END GRADUATION.
Liberal Discount to the Trade. Send for List.

COFFIN & LEIGHTON, Syracuse, N. Y.

DRILL PRESSES
MFRS. OF
THE LARGEST
VARIETY
SEND FOR NEW
30 PAGE CATALOGUE
JUST OUT
DWIGHT SLATE
MACHINE CO.
HARTFORD CONN.

THE ARMSTRONG MFG. CO.,

—Bridgeport, Conn.—

Pipe Threading

AND

Cutting-Off Machines.

Stocks and Dies,

Improved Hinged Vises, Pipe

Wrenches, Pipe Cutters, &c.

SEND FOR CATALOGUE.

NEW YORK OFFICE: 139 CENTRE ST.

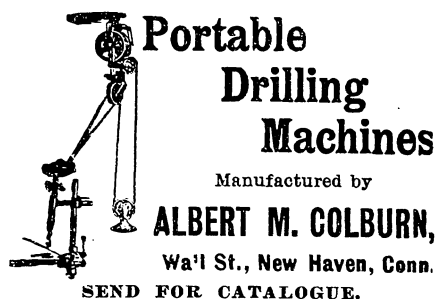
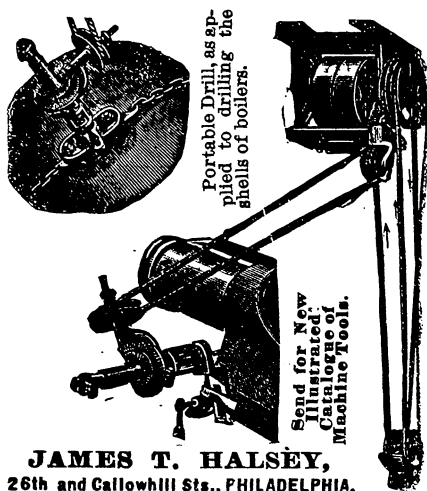
FRICITION CLUTCHES, SHAFTING, HANGERS, PULLEYS.

Sheaves for Rope Driving
Gear Wheels.

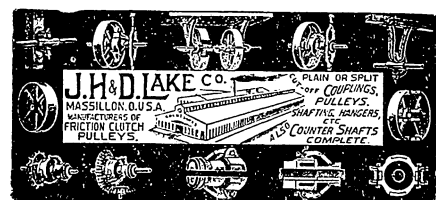
FRICITION PULLEYS.

KEYSTONE CLUTCH AND MACHINE WORKS,

1708-1710 Germantown Ave.,
PHILADELPHIA, PA.



REECE'S PATENT HAND BOLT CUTTER OR SCREW PLATE.



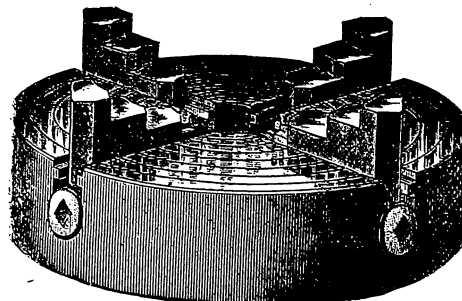
CUSHMAN CHUCKS.

We have recently improved our full line of Geared Scroll Chucks and have also added a 10 1/2 inch and a 15 inch. Prices and discount on application.

Send for our catalogue of all kinds of Lathe and Drill Chucks.

The Cushman Chuck Co.,
Hartford, Conn.

CHAMPION INDEPENDENT CHUCKS.



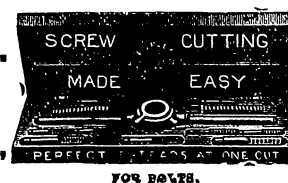
An entirely new line of small Chucks, provided with 3 or 4 independent reversible steel jaws. The best Chuck in the market for foot lathes. Ask your dealer for them or write to us.

THE D. E. WHITON MACHINE CO.
Sole European Agents **SELIG SONNENTHAL & CO.,** London. New London, Conn.



Three styles of Screw Plates **BUILT ENTIRELY ON HONOR**, with prices to suit all. Write for catalogue.

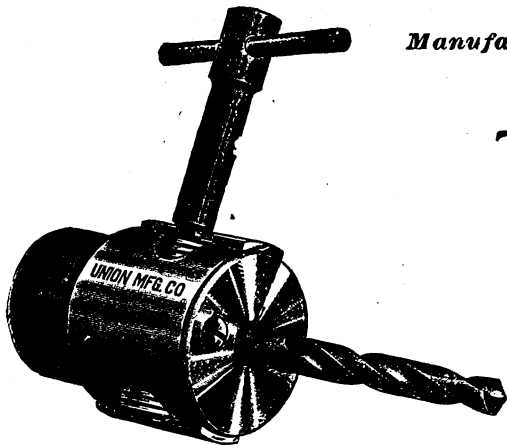
CHAMPION BLOWER & FORCE CO., - - - **LANCASTER, PA.**



UNION MANUFACTURING COMPANY, NEW BRITAIN, CONN.

WAREHOUSE, 103 CHAMBERS ST., NEW YORK.

Manufacturers of Combination, Universal, Independent, and Combination Reversible Jaw Chucks.



THE UNION DRILL CHUCK.

NUMBER.	DIAMETER.	HOLDING.	LIST.
000	1 1/2 inches.	0 to 1/2 inch.	\$7.00
100	2 1/2 "	0 to 1/2 inch.	8.00
101	2 3/4 "	0 to 3/4 inch.	9.00
102	3 1/2 "	0 to 1 inch.	10.00

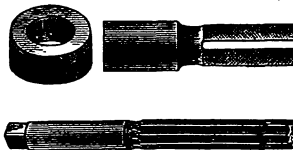
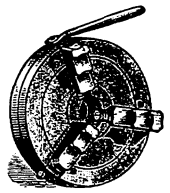
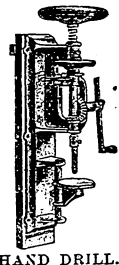
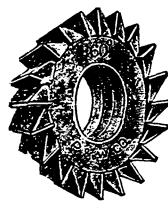
For description and price of the tools illustrated herein, also taps, dies, counterbores, holders with inserted cutters for turning, threading, forming and cutting off, ask for

Hardware Catalogue

—OF—

Pratt & Whitney Co.,

Hartford, Conn., U. S. A.,



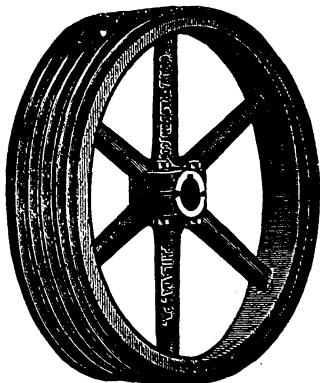
SPIRAL SHEAR PUNCH.

HAND DRILL.

COMBINATION LATHE CHUCK.

GEO. V. CRESSON CO.

18th STREET AND ALLEGHENY AVE.
PHILADELPHIA, PA.



ROPE WHEELS,

All Diameters and Number of Grooves, for Manilla, Hemp, Cotton, or Leather Ropes.

PAPER MACHINERY
FRICTION CLUTCHES

THE MOORE & WHITE CO.
15th & LEHIGH AVENUE

Hicks' Builders' Guide.—Comprising an easy, practical system of estimating material and labor for carpenters, contractors and builders. A comprehensive guide to those engaged in the various branches of the building trades. By I. P. Hicks; illustrated by numerous engravings of original drawings. 160 pages; cloth \$1.00
For sale by David Williams, 96-102 Reade St., N. Y.

Wire Drawing Machines, WATERBURY

Gang Slitters,

Power Presses and Dies,

Tumbling Barrels,

Special Machinery.

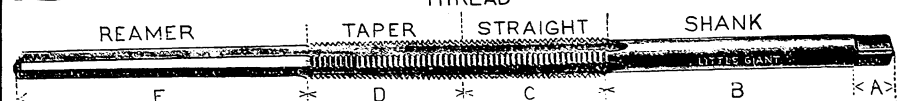
MACHINE CO.,

Waterbury, Conn.

MANUFACTURERS.

Send For Prices.

STAY BOLT TAPS.



We Make a Specialty of this Style of Tap.

CUT THIS OUT, mark Description of TAPS used and send to us for prices.

WELLS BROS. & CO,

GREENFIELD, MASS., U. S. A.

Cutting-Off Machines.

Cone driven or with Auto. Accelerated Speed. Each style the "Standard" in its class and unsurpassed for speed and economy.

Stock Sizes, 2, 3, 4, 5 and 6 inch.

Other Sizes and Special Machines to Order.

Hurlbut-Rogers Machine Co.,

SO. SUDBURY, MASS.

CIRCULARS FREE ON APPLICATION

THE STANDARD TOOL CO., CLEVELAND, OHIO.

MANUFACTURERS OF

Increase Twist Drills, Reamers, Taps, Milling Cutters and Chucks.

Taper Shank
Drills,
St. Shank Drills,
Screw-driver
Bits,
Reamers,
Shell and Solid
Taper Reamers.



Bit Stock Drills for Metal or Wood.



Wood-Boring Brace Drills, will cut off nails.

Hand Taps,
Mach. Screw Taps
"Standard" Drill
Chuck,
"Ellenwood" Drill
Chuck,
Sq. Shank Drills
for Ratchets,
Twist Drills for
Blacksmiths'
Presses

Sockets for
Taper Shank
Drills.Reamers in
all sizes.

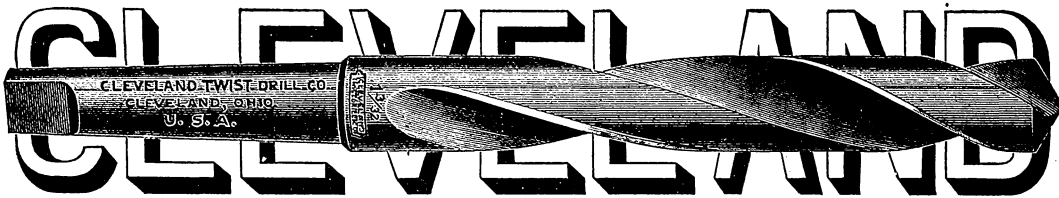
NEW YORK OFFICE, 33 CHAMBERS ST. Send for Catalogue.

1874.

OLD RELIABLE.

1894.

SEND
FOR
CATALOGUE.



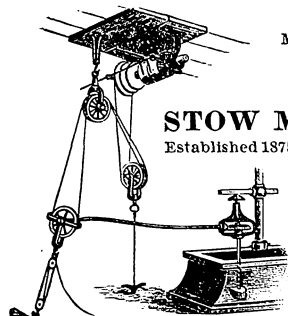
WRITE
FOR
DISCOUNTS.

Our Drills are Hot Forged. The best part of the steel IS NOT CUT OUT and thrown away.



They are TOUGHER, STRONGER, BETTER than is possible to attain by milling. Catalogue and Discounts sent on application.

STOW FLEXIBLE SHAFT,

Invented and
Manufactured by

THE

STOW MFG. CO.,

Established 1875. Binghamton,
N. Y.PORTABLE,
DRILLING
TAPPING,
REAMING.General European Agents,
SELIG SONNENTHAL & CO.,
85 Queen Victoria St., LONDON, ENGLAND.

Thos. H. Dallett & Co.

York St. and Sedgley Ave.,
PHILA.MANUFACTURERS OF
Portable Drills, Hand
Drills, Boiler Shell Drills
Electric Motors specially
adapted for driving Ma-
chine Tools, Cranes, Ele-
vators, Pumps, Presses and
other machinery.Complete Power and Light
Plants Installed.

Stow Flexible Shaft Co., Limited,

26th, Callowhill & Biddle Sts

PHILA., PA.,

Manufacturers of

PORTABLE DRILLING,
TAPPING, REAMING
and BORING MACHINEAlso, Tools for Emery Wheel
Grinding, Metal and Wood Pol-
ishing, Cattle Brushing, and
Clipping, &c.Gen'l European
Agents.

Bolling & Lowe,

2 Lawrence,

Pountney Hill.

LONDON, ENG.



Morse Twist Drill & Machine Co.,

NEW BEDFORD, MASS.

Manufacturers of

Milling

Cutters,

Heading

Mills,

Interlocking

Mills,

Angular

Mills,

Slitting

Saws,

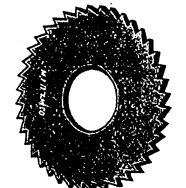
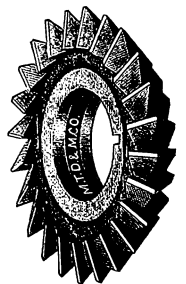
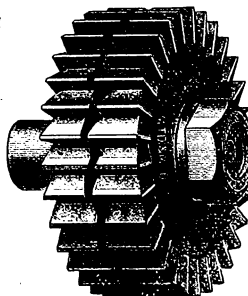
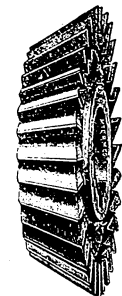
Screw

Slotting

Cutters,

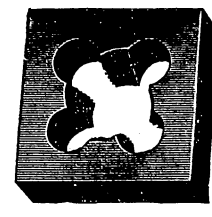
And Mills of any shape and for any use.

SEND FOR CATALOGUE.



MANNING, MAXWELL & MOORE,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S

Manufacture of Patent Machine Relieved Nut, Hand,
Blacksmith and Machine Screw Taps, Screw Plates, Tap
Wrenches and Patent Relieved Pipe Taps and
Pipe Reamers; also of Solid Bolt and Pipe
Dies. Furnished in V. U. S. Standard and
Whitworth shape of threads.

111 Liberty Street,

NEW YORK.



HAVE YOU EVER HEARD OF

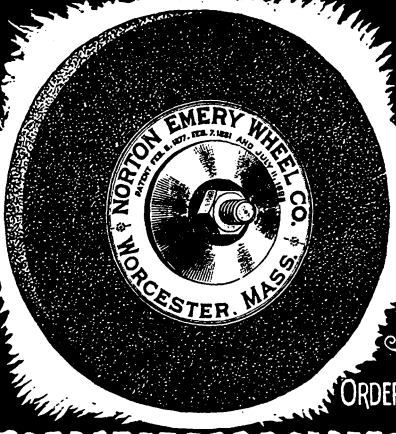
THE WONDERFUL FORSTNER AUGER BIT ?

If not, it will pay you to send for a sample 4-8 bit and price-list. Sent on receipt of 5¢ cents. It will bore
Round, Oval and Square Holes, and cannot be equaled for fine carpentry, cabinet or pattern work. Discount
to dealers on application. FOR SALE BY ALL HARDWARE DEALERS.

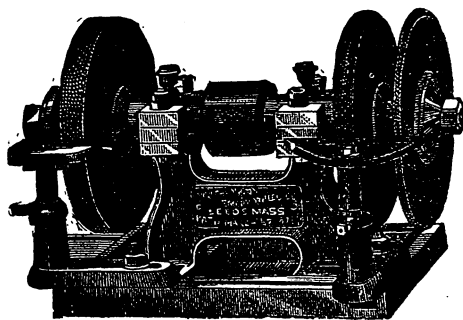
THE BRIDGEPORT GUN IMPLEMENT CO.,

Depot for Sales.

313 and 315 Broadway, New York.



Send to
NORTON EMERY WHEEL CO.
 WORCESTER, MASS.
 FOR ILLUSTRATED CATALOGUE OF
EMERY & CORUNDUM WHEELS.
Emery Wheel Machinery ETC.
 ORDERS SOLICITED FOR NEW & EXPERIMENTAL WORK.



ESTABLISHED 1887. CAPITAL \$100,000

Northampton Emery Wheel Co.
 LEEDS, MASS.

And 20 South Canal St., Chicago.

MANUFACTURERS OF

EMERY WHEELS

—AND—

EMERY WHEEL MACHINERY*Of Best Quality.*

Send for Catalogue. FACTORY AT LEEDS, MASS

DO NOT BE DECEIVED.

The Samson

is the best mounted grindstone on the market, and the weight is always as advertised.

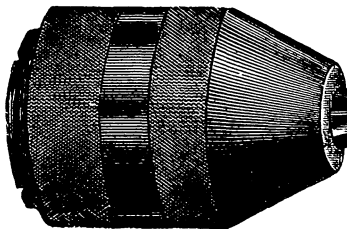
Send for Catalogue C.

The Cleveland Stone Co.
 CLEVELAND, O.



THE Bennett Emery Wheel Dresser

Does the best work, does it easy, quick and the most for the least money. Manufactured by Bay State Stamping Co., 17 Hermon Street, Worcester, Mass.



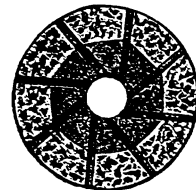
THE NEW GIANT DRILL CHUCK.
 Holds a Drill With the Grip of a Giant. All Steel
 Parts Interchangeable.
SIMPLE IN CONSTRUCTION.

EASY TO TAKE APART AND CLEAN. BEST OF WORKMANSHIP AND VERY CHEAP. Manufactured and sold by

THE SMITH & EGGE MFG. CO., Bridgeport, Conn

Patent ROCK EMERY MILL STONES.

Next to
 Diamonds
 in
 Hardness
 and
 Durability.



Made to
 Fit Any
 Mill Frame
 without
 change.

Cuts every substance with unexampled rapidity; always sharp; emery face Never Dressed. As much more Durable than other stones as they are Harder. Never Glaze; grind everything. Most Rapid Grinder known.

Send for Circular.

STURTEVANT MILL CO., Boston, Mass.

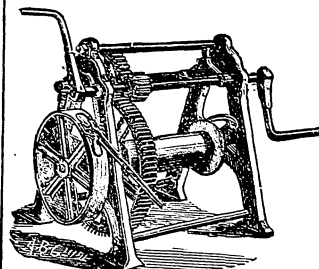
BUSINESS ESTABLISHED 1798.

INCORPORATED 1891.

JOS F. McCOY CO.,

26 Warren St., New York,

HEADQUARTERS FOR



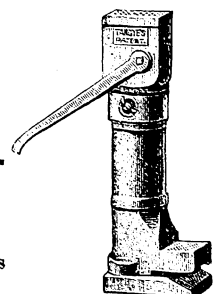
**Hoisting
 Crabs,
 ALL IRON.**

SIZES:
 1/4 ton to 70 tons.

**Tangye's
 Hydraulic
 Jacks.**

SIZES:

4 tons to 200 tons. Lifts on foot or top.



WRITE FOR

Our New 1894 Catalogue,

JUST ISSUED,

SHOWING SEVERAL NEW MACHINES, a number of which have been designed specially for

BICYCLE MANUFACTURING.

Also showing REDUCTION IN PRICES on some of our regular machines

THE CARVIN MACHINE CO.,

Laight and Canal Sts., NEW YORK.

A Treatise on Belts and Pulleys.

Embracing full explanations of Fundamental Principles; proper Disposition of Pulleys; Rules for determining widths of leather and vulcanized rubber belts, and belts running over covered pulleys; Strength and Proportions of Pulleys, Drums, &c. Together with the principles and necessary rules for Rope Gearing and transmission of power by means of Metallic Cables. By J. Howard Cromwell, Ph. B., author of a Treatise on Toothed Gearing. 12mo, cloth. \$1.50.

Sent, post-paid, on receipt of price, by

DAVID WILLIAMS, - - - Publisher and Bookseller,

96-102 Reade Street, NEW YORK.

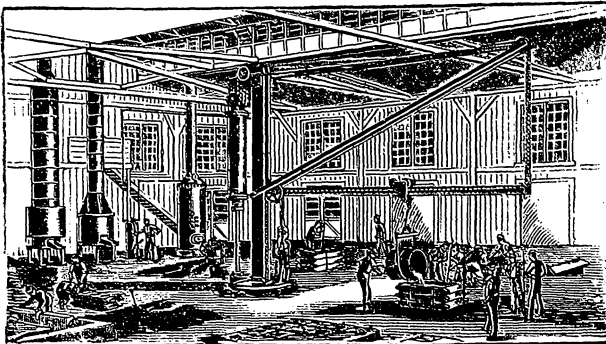
All We Ask.

USERS.

The Largest and Best Concerns.

Frazer & Chalmers.
Gaar, Scott & Co.
J. I. Case Threshing Machine Co.
Colorado Fuel & Iron Co.
Solid Steel Co.
Sterling Boiler Co.
Otis Bros. & Co.
Geo. V. Cresson Co.
Pittsburgh Steel Casting Co.
Eynon-Evans Mfg. Co.
Harrison Safety Boiler Co.
Hoopes & Townsend.
Hughes & Patterson.
Shickie, Harrison & Howards Iron Co.
Rensselaer Mfg. Co.
Buffalo Cast Iron Pipe Co.
Buffalo Furnace Co.
National Pipe & Foundry Co.
John Brennan & Co.
Murray Iron Works.
Danville Foundry & Machine Co.
Sears & Nicols.
Moore & Brady.
Pearson & Co.
Morton Reed & Co.
Benj. Atha & Illingworth Co.
Montgomery Furnace Co.
John Q. Denny.
I. G. Johnson & Co.
Canda Mfg. Co.
Crane & Breed Mfg. Co.
Diamond State Iron Co.
Hartman Mfg. Co.
Blankley Bros. & Co.
Port Henry Furnace Co.
Wm. L. Bailey & Co.
Akron Iron Co.
And others.

If you need a crane for any purpose, go and see the **Ridgway Balanced Steam-Hydraulic** in use. If you will do that no one could give you any other kind. Look over the list of users. Reckon you know some of them. Must be a wonderful crane to take like that, eh? You ought to hear what they say about it!



5-ton Ridgway Crane in Foundry Diamond State Iron Co., Wilmington, Del.

IDEAL CRANE FOR FOUNDRY OR MILL.

Rapid, Safe, Sure and not costly. No pumps, no accumulator, no shocks, no bother with valves and packings. None of that awful waste of power. No freezing. No bother of any sort.

Attached to any steam supply is ready for business at once. Uses so little steam it is never missed. No special operator required. Absolutely safe. Being balanced it is easy on buildings. Sets indoors or outdoors. So cheap any plant can use it. Earns its cost always in a few months.

The best concerns everywhere are getting them. Look each side of you. Some have eight or nine or more of them. They save dollars in handling goods; that's the reason. Does the work while other cranes are getting ready to do it.

We make many styles—also Elevators.

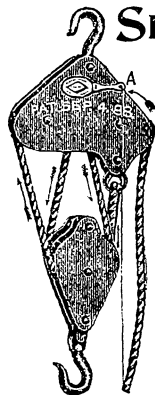
SEND FOR CIRCULAR.

CRAIG RIDGWAY & SON,
COATESVILLE, PA.

USERS.

The Largest and Best Concerns.

Penna. Steel Co.
Illinois Steel Co.
National Tube Works Co.
Phoenix Iron Co.
Henry Disston & Sons Co.
A. & P. Roberts Co.
Catasauqua Mfg. Co.
Mahoning Rolling Mill Co.
Harrisburg Rolling Mill Co.
New Phila. Iron & Steel Co.
Old Dominion Iron & Steel Co.
Standard Iron Co.
Cambria Iron Co.
Johnson Co.
Norristown Steel Co.
Midland Steel Co.
Kellogg Seamless Tube Co.
American Steel Wheel Co.
Benwood Steel Co.
Bellaire Nail Works
Oliver Iron & Steel Co.
Jones & Laughlin.
West Superior Iron & Steel Co.
Nova Scotia Iron & Forge Co.
Reading Iron Co.
Spang Steel & Iron Co.
Apollo Steel & Iron Co.
Glasgow Iron Co.
Harrisburg Car Co.
Atlantic Refining Co.
W. W. Kurtz & Sons.
Kilmer Mfg. Co.
J. W. Friend & Co.
American Wire Nail Co.
New Haven Wire Co.
E. & G. Brooke Iron Co.
Passaic Rolling Mill Co.
Moorehead-McCleane Co.
And others.



SELL THE BEST.

THE "SURE GRIP" Steel Tackle Block

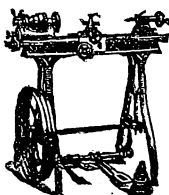
is taking the place of all other hoisting blocks.

Send for catalogue and discount.

Fulton Iron & Engine Works,
28 Brush St., Detroit, Mich.

ESTABLISHED 1852.

FOR SALE IN CANADA BY
Rice Lewis & Son, Ltd.,
TORONTO, CAN.



Foot & Hand Power Machinery

Screw Cutting Lathes, Wood Turning Lathes, Scroll Saws,
Circular Saws, Moulders, Mortisers, Etc.

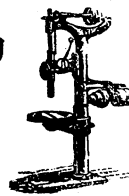
Strictly High Grade. Catalogue Free.

SENECA FALLS MFG. CO.,
255 Water St., Seneca Falls, N. Y., U. S. A.

London Agency, MESSRS. CHAS. CHURCHILL & Co., 21 Cross St.,
Finsbury, London, E. C., England.



BORING AND TURNING MILLS,
UNIVERSAL, RADIAL AND UPRIGHT DRILLS,
ALL SIZES.
BICKFORD DRILL & TOOL CO.,
10 Lawrence Street, Cincinnati, O.



Highest Efficiency.

WESTON'S NEW TRIPLEX Chain Block

far exceeds all predecessors.
Send for Prof. Thurston's report
of comparative tests of all
chain pulley blocks.

The Yale & Towne Mfg. Co.
STAMFORD, CONN.

New York, 84-86 Chambers St.
Chicago, 152-154 Wabash Ave.
Philadelphia, 1120 Market St.
Boston, 224 Franklin St.

BORING AND TURNING MILLS, LAATHES.

ISRAEL H. JOHNSON, JR., & CO., - PHILADELPHIA.

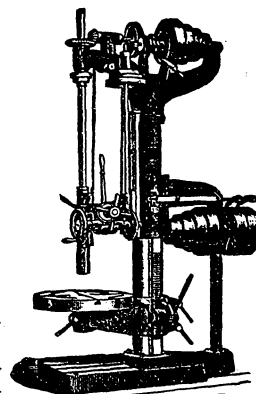
THE Tool Room

Or Machine Shop without proper machinery for keeping old tools in repair and the making of new ones cannot hope to succeed. The Hamilton Drill Press is a necessary adjunct to all such, because it does all that a tool of this kind can do, and besides, it's built on honor.

THE HAMILTON MACHINE TOOL COMPANY

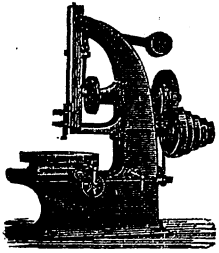
WEST MARKET STREET,

Hamilton, - Ohio, U. S. A.



Engine Room Chat. By ROB. GRIMSHAW. This little book presents in colloquial style ideas which appeal to all interested in the generation of power, more particularly those charged with the care of engines and boilers and their appurtenances. 148 pages, cloth. \$1.00

For sale by DAVID WILLIAMS, 96-102 Reade st., N. Y.

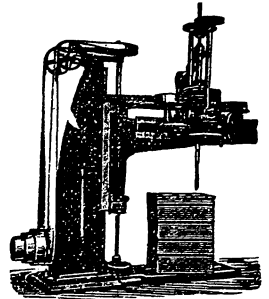


William Sellers & Co., Incorp.

PHILADELPHIA, PA.,

—MANUFACTURERS OF—

Improved Machine Tools for Working Iron and Steel,
High Speed Power Traveling and Swing Cranes,
Injectors, Locomotive Turn Tables, Shafting, &c., &c.
Testing Machines, under patents of A. H. Emery.
Prices, Descriptive Matter, &c., Furnished on Application.



**MORSE,
WILLIAMS
& CO.**

Morse Elevator Works.

MANUFACTURERS AND BUILDERS OF
ELECTRIC, HYDRAULIC, BELT and HAND
POWER PASSENGER and FREIGHT
ELEVATORS.

1105 Frankford Ave., Philadelphia. 108 Liberty St., New York.
1116 E. St., N. W., Washington, D.C. 33 Lincoln St., Boston.
425 Spruce St., Scranton, Pa. 82 Church St., New Haven.
Omaha Building, Chicago, Ill.

FAIRMOUNT MACHINE CO.,

(Successors to Thomas Wood & Co.)

Twenty-second and Wood Sts., Philadelphia, Pa.

Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Elevators.

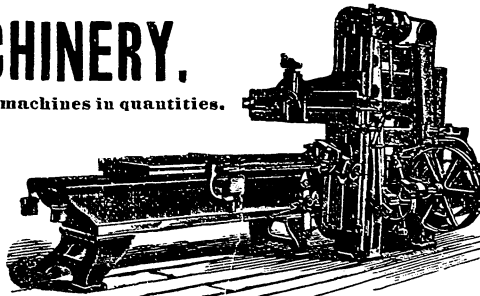
Rope Transmission; Sheave Wheels, any size required, for Hemp, Manila and Cotton Rope Driving. Looms, Cotton and Woolen Machinery for Winding, Spooling, Reeling, Beaming, Warping, Dyeing, Sizing, Scouring &c.

OPEN SIDE PLANERS.

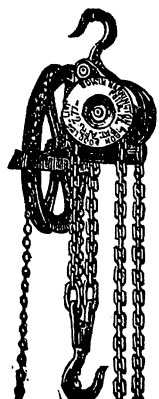
READY FOR IMMEDIATE DELIVERY.

SPECIAL MACHINERY.

We will take pleasure in estimating on machines in quantities.



**DETRICK & HARVEY
MACHINE CO.,**
MANUFACTURERS,
BALTIMORE, - - MD.



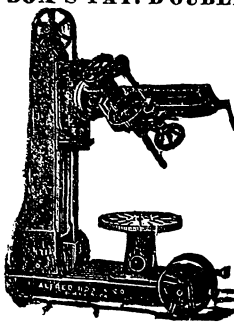
**E. Harrington, Son
& Co., Incorporated.**

ESTABLISHED 1867.
MANUFACTURERS
Engine Lathes, Drills, Planers, &c.
Double Chain Screw Hoists
Geared Travelers and
Turntables.
Gear Cutting a Specialty.

1508 Pennsylvania Ave.,
Philadelphia, Pa.

Alfred Box & Co.,
Front, Poplar and Canal Sts., Philadelphia.
SOLE MANUFACTURERS OF
BOX'S PAT. DOUBLE SCREW HOISTS

25,000 supplied in the United States exclusive of foreign trade; a record that tells its own story; a record of solid, substantial growth; extensive new works necessary to keep up with orders in our specialties; ample room now to build the heaviest class of Traveling and Jib Cranes of all sizes, Overhead Railways, Trolleys, Special Hoisting Gear for home-made Cranes; also our Patent Radial Drills and Gang Drills, as used by bridge builders. Estimates furnished with photos. Correspondence solicited, or visit our works.



Maris & Beekley.
PHILA., PA.

MANUFACTURERS OF
CRANES,

Power Bridge
Cranes, Hand
Bridge Cranes,
Jib Cranes.

Portable Hoist.
Holds load at any point.

Overhead Track,
Trolleys,
Switches.



J. G. SPEIDEL,
807 & 809 CHERRY STREET,
READING, PA.
Patentee and Manufacturer of the celebrated

Economic Safety Hoist.

500 to 30,000 Lbs. Capacity.
Has been awarded the John Scott Medal and Premium by the Franklin Institute of the City of Philadelphia for Highest Efficiency, Simplicity and Durability.

One man can lift two to three times as fast as with any other self-holding chain hoist. It has two speeds, is built strong and durable, and guaranteed to give satisfaction.

TRAVELING AND SWING CRANES up to 30,000 lbs. capacity and 50 ft. span. Overhead Tramway, with Trolleys, Switches, &c. Elevators and Special Hoisting Machinery. Illustrated Cat. and Prices on application.



Moore Mfg. & Fdry. Co.,

Milwaukee, Wis., U. S. A.,

Manufacturers of

Moore's Anti-Friction

Differential

Chain

Pulley

Block.

A New Movement!
A Perpetual Compound Lever!

Powerful, Simple and Durable!

One Man Can Lift to the Full Capacity of the Block.

Self-Sustaining at Any Point.

The Block Always Hangs Plumb.

Send for descriptive price list, mentioning this paper.

POWER PRESSES,

—MANUFACTURED BY—

THE E. J. Manville Machine Co.,

WATERBURY, CONN.

Open Back Blanking Press.

Made in several sizes.

SOME SPECIAL POINTS :

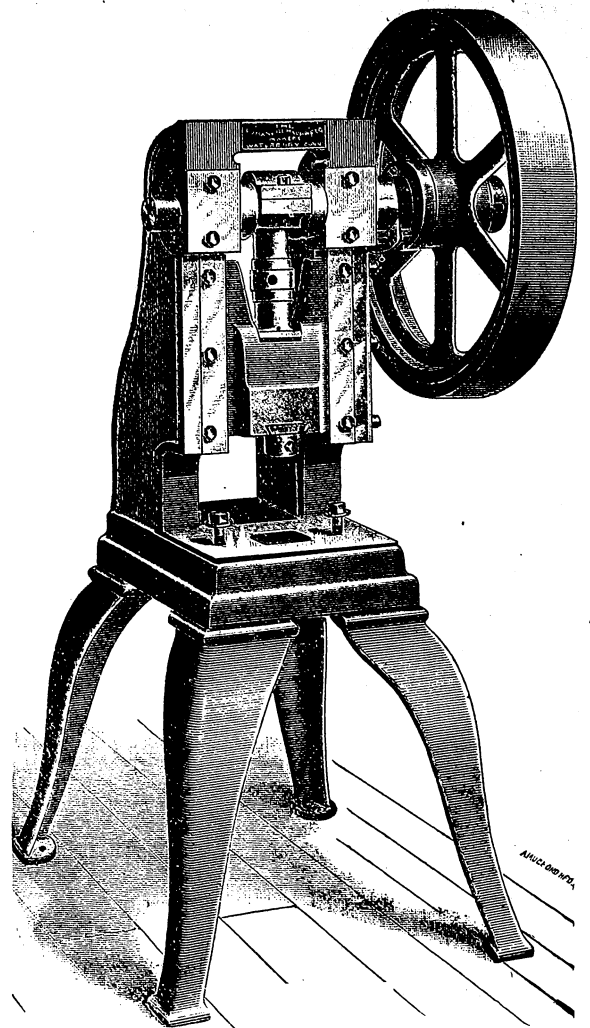
STRENGTH,
DURABILITY,
GOOD PROPORTIONS,
EASY ADJUSTMENT.

SEND FOR FULL DESCRIPTION.

SPECIAL
AUTOMATIC
MACHINES.

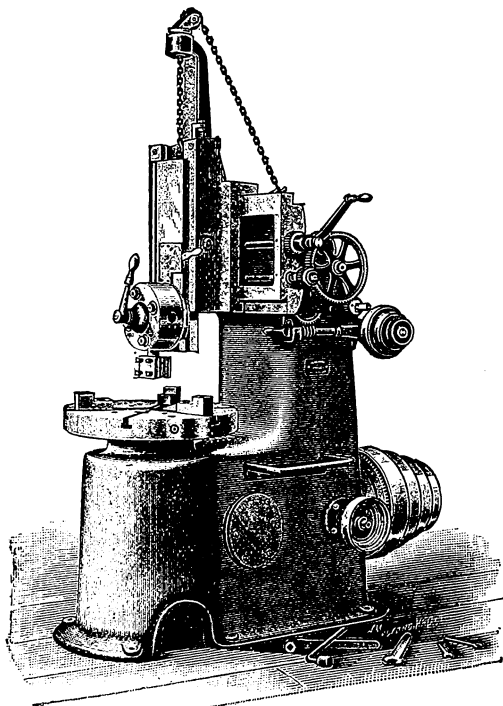
POWER PRESSES.

WIRE WORKING
MACHINES.



SOMETHING NEW.

30 Inch Vertical Chucking and Facing Machine, with Back Gears.



Capacity, 30 inches in diameter and 14 inches in height, under the rail.

Table is 24 inches in diameter and has a universal chuck.

Feeds are automatic in all directions and are provided with trips.

Countershaft has one 16-inch and one 20-inch pulley, giving 16 changes of speed, 8 with cone and 8 with back gears.

Let Us Send More Complete Information.

BRIDGEPORT MACHINE TOOL WORKS,

E. P. BULLARD, Prop., - Bridgeport, Conn.

N. Y. OFFICE, 39 Cortlandt Street, Room 86.

SECOND-HAND MACHINERY, BOILER and BRIDGE TOOLS IN STOCK for Immediate Delivery.

ENGINE LATHES.

12 in. x 6 ft. Reed.
14 in. x 6 ft. Hendey.
16 in. x 6 ft. New Haven.
18 in. x 8 ft. Ames.
18 in. x 8 ft. Eddy.
20 in. x 8 ft. Putnam.
20 in. x 10 ft. Fitchburg.
22 in. x 8 ft. Prentice.
24 in. x 12 ft. Putnam.
30 in. x 10 ft. Pond.
32 in. x 16 ft. Gleason.
84 in. x 20 ft. Lincoln

BRASS LATHES.

14 in. x 6 ft. Springfield.
15 in. x 6 ft. Am. Tool Co.

PLANERS.

19 in. x 3 ft. Wheeler.
20 in. x 4 ft. Lathe & Morse.
22 in. x 6 ft. Wheeler.
24 in. x 4 ft. Rialdel.
24 in. x 5 ft. New Haven.
24 in. x 6 ft. Wood & Light.
26 in. x 6 ft. Pease.
28 in. x 8 ft. Pease.
30 in. x 6 ft. Pease.
32 in. x 8 ft. Pease.
35 in. x 7 ft. Hewes & Phil.
38 in. x 8 ft. Pease.
38 in. x 16 ft. Bancroft.

SHAPERS.

6 in. Stroke. Crank.
8 " " Gould.
15 " " Hendey.
16 " " Gould & Eber.
22 " " Geared.

DRILLS.

20 in. Swing. Prentice.
26 in. Complete. Prentice.

J. J. McCabe,

14 Dey Street, - New York.

Successor to E. P. BULLARD'S N. Y. Machinery
Warerooms.

New and Second-Hand Machinery.

- 1 Schrimmer Wood Carver. Nearly new.
- 1 26 1/2 in. Leffel Water Wheel. Second-hand.
- 2 35 in.
- 1 Eureka Smutter. Nearly new.
- 1 No 3 Diamond Water Grider. New.
- 1 No. 2
- 1 H. B. Smith Blind Slat Tenoner. Second-hand.
- 1 20 in. Clement Pony Planer. Second-hand.
- 1 24 in. " Buzz
- 1 30 in. " Gauge Lathe. "
- 1 Two Spindle Graham Shaper. "
- 2 13 in. x 7 ft. Sebastian Lathe. New.
- 2 15 in. x 7 ft.
- 10 Wood Frame Saw Tables. Second-hand.
- 1 Knapp Dovetailing Machine. Second-hand.
- 1 Rowley & Hermance Three Sided Molder. Second-hand.
- 1 Clement Rod and Dowel Machine. Second-hand.
- 1 Clement Dado Machine. Second-hand.
- 1 H. B. Smith Jointed Sander. Second-hand.
- 1 Clement Vertical Boring Machine. Second-hand.
- 1 Clement Boring and Bit Mortising Machine. Second-hand.
- 1 Large Gas Furnace. Second-hand.
- 1 35 in. Exhaust Fan. Second-hand.
- 1 72 in. Fan Blower. Sturtevant. Second-hand.
- 1 Clement Chair Round Machine. Second-hand.
- 1 24 in. Pony Planer. Second-hand.

This list will be changed each week.

W. P. DAVIS,

Rochester, N. Y.

Second-hand Machinery For Sale.

- 2 36 in. x 11 ft Horizontal Stationary Boilers.
- 1 12 H.-P. Upright Engine (Greenfield).
- 1 18 H.-P. Upright Boiler.
- 1 15 H.-P. Horizontal Engine.
- 1 24 to 1 1/4 in. Open Die Bolt Cutter.
- 1 24 in. x 25 ft. Engine Lathe.
- 2 No. 2 Roots' Blowers.
- 2 No. 6 Roots' Blowers.

Also other machinery at low prices.

COOKE & CO.,

163 and 165 Washington St., New York.

FOR SALE.

Wright Automatic Engine, 16 in. x 32 in.

Ball Electric Light Engine, 13 in. x 14 in., 100 H.-P.

F. McSWEGAN & SONS,

Dover St. and Franklin Square, N. Y.

BARGAINS IN SECOND-HAND BOILERS.

Good for 100 lbs. Pressure and upwards
in the Hartford Boiler Inspection Co.

Eight 50 to 70 H.-P. Locomotive Boilers, 54 in. x 15 ft., 123 2/3 in. Tubes, built 1/2 in. steel.
Ten 100 H.-P. Vertical Boilers, 60 in. x 16 ft., 162 2 in. Tubes, built 1/2 in. and 3/4 in. steel.
Two 40 H.-P. Vertical Boilers, 42 in. x 10 ft., 120 2 in. Tubes, built 5-16 in. steel.
Boilers are complete with a full equipment of fittings. Will sell at lowest prices.

L. F. SEYFERT'S SONS,

437-441 N. 3d St., Philadelphia, Pa.

SECOND-HAND MACHINERY.

14 in. x 6 ft. Fitchburg Engine Lathe.
14 in. x 8 ft. " " "
21 in. x 14 ft. " " "
15 in. x 8 ft. Plain Turning Engine Lathe.
24 in. x 12 ft. Chamberlain Engine Lathe.
9 in. New York Steam Engine Co. Shaper.
8 in. Niles Semi-Universal Radial Drill.
9 in. Niles Slotting Machine.
60 in. Niles Pulley Borer.
60-96 in. Niles Pulley Lathe.
4 ft. 3/4 in. Betts Mch. Co. Hand Boiler Rolls.
8 ft. 3 in. " " Power " "
8 ft. Morgan, Williams and Co. Power Boiler Rolls.
No. 37 Morgan, Williams and Co. Comb. Punch and Shear.
20 in. throat Betts Machine Co. Double End Punch and Shear.
25 in. x 25 in. x 5 1/2 ft. Hubener Screw Planer.
51 in. x 45 in. x 15 1/2 ft. New Haven Planer.
All in good order.

Also 600 new and second-hand tools in stock. Send for list.

PRENTISS TOOL & SUPPLY CO.,

115 Liberty Street, NEW YORK.

59 South Canal Street, CHICAGO, ILL.

FOR SALE.

Engines with Cylinders 26 in. x 48 in. and smaller.
Portable, Tubular and Vertical Boilers of all sizes.
13 2-yard 8-ft. gauge all around Dump Cars.
7 Narrow Gauge and 2 Standard Gauge Locomotives.
1 Large Worthington Duplex and other Pressure Pumps. New and Second-hand.
Hoisting Engines and Grinding Fans.
Rail, Sheet and Clipping Shears.

THOMAS CARLIN'S SONS,
Allegheny, Pa.

PLANER, 24 in. x 24 in. x 8 ft., table. Good order \$185.00
36 in. x 24 ft. Bk. Gd. So. Cut'g Rebuilt Lathe.. 650.00
No. 1 Dallett Portable Drill. Good as new..... 90.00
38 in. Bk. Gd. Drill, heavy. Good as new..... 275.00
21 1/4 in. Heavy Lever Feed Drill. New..... 50.00
Forging Drop, 100-lb. Hammer, New Design... 160.00
Wire Straightener and Cutter, Semi-Aut..... 60.00
Bolt Cutter, New Head and Dies, 3/4 to 1 1/4 in..... 175.00
Power Punch Presses..... \$75.00 and upward.

AMER. TOOL WORKS. Cleveland, O.

FOR SALE.

2 Double Deck Boilers about 40 H.-P. each, cheap. Hoisting Engine. Cylinder Boilers for Stacks, 30, 36 and 42 in. diameter. Round and Square Iron Tanks. Blow Offs. 5 Brass Cannons about 1400 or 1500 pounds each. Good order. All kinds of Scrap Iron and Metals on hand.

BUSSENIUS & CUNLIFE,
12th and Washington Ave., Philadelphia.

WANTED.

Wrought and Steel Scrap, Boiler Plate, Cast Machinery Scrap, Stove Plate and Burnt Iron.

JOHN W. SWANGER & CO.,

Crum Lynne, Pa.

FOR

MACHINERY

ADDRESS US.

Pennsylvania Mch. Co., Ltd.,

PHILADELPHIA, PA.

Machinery,

New and Second-Hand, For Sale.

93 in. Hydraulic Riveter, Jones & Lamson.
Traveling Crane, 100 in. Swing Engine
No. 2 Plate Planer, 16 1/2 ft. Lathe, 20 ft. Bed.
one setting up to 1 inch 51 in. Swing Engine Lathe, 18 ft. Bed.
No. 27 Shear, 30 1/2 in. throat, cuts 3/4 in. Plate. 32 in. Swing Engine Lathe, 16 ft. Bed.
All the above are New 25 in. Swing Engine Lathe, 16 ft. Bed.
Bement, Miles & Co. make. 24 in. Swing Engine Lathe, 25 ft. Bed.
Power Bending Rolls, 8 ft. Other sizes, different lengths Beds.
3 in. between Housings. Drill Presses, Radial Drills, Gang Drills, Mill'g Mch.
72 in. x 60 in. x 24 ft. 4 No. 1 and 3 Univ. Millers, B. & S. Allen Pneumatic
Heads. 60 in. x 60 in. x 16 ft. 2 Riveter for Bridge work.
69 in. x 52 in. x 15 ft. 1 Bolt Cutters 1 1/2, 1 1/4 & 2 in.
30 in. x 30 in. x 12 ft. 1 18 x 42 Corliss Hor. Engine.
Head. 14 1/2 x 15 Phoenix Aut. Eng.
13 x 12 13 x 16 N. Y. S. E. Co.
Other sizes smaller. 36 x 36 x 16 ft. Gray Co. 10 x 12 Slide Val. Hor. Eng.
Switch Planer, 2 Heads. Blake Duplex Compound
Good as new. Pumps, &c.

Send For Latest List.

Geo. Place Machine Co.

Warehouse, 511 & 513 West 13th St.

Office, 120 Broadway, New York.

32-INCH UPRIGHT DRILL PRESS.

TWO OF THEM; SECOND HAND.

Makers' Name, KERKHOFF & CO.
Height, 8 ft. 2 in.

Greatest Distance Spindle to Base Plate, 52 in.
Greatest Distance Table to Spindle, 38 in.

Weight complete, 2600 lbs.
Back Geared and Power Feed, Quick Return, Balanced Spindle; Shafts and Studs made of Steel.

THE SCRANTON SUPPLY & MACHINERY CO.,
SCRANTON, PA.

For Sale, Very Low for Cash.

500 tons Relaying Steel Street Rails, side bearing, 35 to 47 lb. sections. Also 65-lb. Steel T's.

WM. H. PERRY & CO., Providence, R. I.

SEE HERE!

1 each Garvin No. 2 & No. 4 Milling Machines, 2d hand.
1 Pratt & Whitney Lincoln Miller No. 3, 2d hand.
30 in. Henley Pulley Lathe, 2nd Hand.
1 Lodge & Davis 17 x 6 Engine Lathe, 2d hand.
1 Pratt & Whitney 10 x 6 Engine Lathe, 2d hand.
1 Lodge & Davis 31 x 8 Engine Lathe, 2d hand.
1 Dietz Gang 22 x 8 Engine Lathe, 2d hand.
1 New Haven 28 x 8
1 Dietz Gang 80 in. Radial Drill, " "
1 20 in. Lever Drill, new.
1 each Lodge & Davis 15 in. and 20 in. Shaper, new.
1 Gear Cutter, will cut up to 40 in. 2d hand.
1 Baker Bros. Universal Saw Bench, new.
A full line of the most improved Turret Lathes, and Pulley Machinery, also Motor Gear Cylinder Boring and Triple Facing Machines.

THE LODGE & SHIPLEY MACHINE TOOL CO.,
107-113 Culvert St., Cincinnati, Ohio.

For Sale Cheap.

Special lot of

NEW ENGINE LATHES,

13 in. x 5 ft. 17 in. x any length bed.
15 in. x 6 ft. 27 in. x any length bed.
27 in. x 12 ft. 30 in. x any length bed.
32 in. x 12 ft. 32 in. x any length bed.

ADDRESS

Draper Machine Tool Co.,

Successors to

LATHE & MORSE TOOL CO.,

130 Gold Street,

WORCESTER, MASS.

BARGAINS.

24 x 48 Miller & Allen Corliss Engine.
16 x 36 Slide Valve Engine.
16 x 24 " " " New.
15 x 30 " " " "
15 x 18 " " " "
14 x 30 " " " "
12 x 20 " " " " New.
14 x 20 Vertical " "

A large number of new and second-hand Boilers, Engines, Lathes, Planers, Shapers, Millers, &c., in stock.

Write us for what you want and we will give you prices and full information.

LOVEGROVE & CO.,
Third and Quarry Sts., Phila., Pa.

SECOND-HAND MACHINERY.

One Fifield Screw Cutting Engine Lathe, 30 in. swing on 16 ft. bed, with blocks to raise same to swing 47 in.

One Fifield Screw Cutting Engine Lathe, 38 in. swing on 14 ft. bed.

One Pratt & Whitney 36 in. Gap Chucking Lathe.

One Pease Planer, 24 in. x 24 in. x 6 ft.

One Iron Planer, 52 in. wide, 44 in. high, 12 ft. long, with two heads on the cross rail.

One L. W. Pond Gear Cutter, to cut gears 36 in. diameter, 5 in. face, also arranged for cutting bevels.

HILL, CLARKE & CO.,
156 Oliver St., Boston, Mass.
12 and 14 South Canal St., Chicago, Ill.

SECOND-HAND MACHINERY.

1 Iron Planer 80 in. x 60 in. x 20 ft., 2 heads on Cross Rail.
1 Iron Planer 34 in. x 26 in. x 7 ft. 1 30 in. x 30 in. x 8 ft.
1 Iron Planer 24 in. x 24 in. x 4 ft. 1 32 in. x 25 in. x 6 ft. 6 in.
1 Iron Planer 16 in. x 12 in. x 3 ft. 1 20 in. x 20 in. x 5 ft.
1 Engine Lathe 48 in. x 16 ft., raised to 60 in., Putnam make.
1 Engine Lathe 36 in. x 14 ft., Putnam make.
1 " " 37 in. x 17 ft., D. W. Pond make.
1 " " 26 in. x 10 ft., " "
1 " " 2 in x 25 ft. 6 in., A1. 1 24 in. x 14 in., New Haven.
1 Engine Lathe 20 in. x 12 ft., New Haven. 1 18 in. x 8 ft., New Haven.
1 Drilling Machine, 40 in., B. G. S. F. 1 36 in., B. G. S. F., both New Haven.
1 Drilling Machine 30 in. R. G. Gould.
1 13 in. Shaping Machine, Gould.
1 Pond Index Milling Machine.
1 600 lb. Merritt Drop, Friction.
1 425 in. Peck Lathe, Geared.
1 All kinds of Iron and Wood Working Machinery.
Lists sent. NEW YORK MACHINERY DEPOT, Office 178 Broadway, N. Y.

Don't Overlook These Bargains.

2 66 x 16 Horizontal Return Tubular Boilers.
1 62 x 16 " "
1 13 H.-P. Vertical Boiler, New.
1 22 H.-P. " "
1 40 H.-P. Double Decked, Second-hand.
1 8 H.-P. Portable Engine and Boiler, Second-hand.
1 10 H.-P. " " " " New.
1 10 H.-P. " " " " Second-hand.
1 60 H.-P. Ball Automatic Engine, good condition.
1 No. 1 Exeter Blower, New.
1 8 H.-P. Vertical Boiler on wheels.

OLIVER C. BOYD,
Lebanon, Pa.

WANTED.

Second-hand, about 30 gallon, Iron Steam Jacket Kettle. Quote price and advise condition. W. L. BLAKE & CO.,
Portland, Me.

FOR SALE.

One 25 H.-P. Otto Gas Engine in first-class condition. Can be bought very reasonable. BIRMINGHAM IRON FOUNDRY,
Birmingham, Conn.

RELAYING RAILS.

10 Tons 80 lbs. Steel Rails.
50 Tons 65 lbs. Steel Rails.
130 Tons 30 lbs. Steel Rails.
20 Tons 25 lbs. Steel Rails.
4 Tons 12 lbs. Iron Rails.

CAST IRON PIPE.

36 Lengths 14 in. dia. Bell and Spigot.
21 Lengths 16 in. dia. Bell and Spigot.
233 Lengths 20 in. dia. Bell and Spigot.
All perfect. Prices the lowest ever heard of.

THOS. P. CONARD,

206 Walnut Place, Philadelphia.

SECOND HAND.

36 x 48 Corliss Engine, 50-ton wheel.
34 x 60 " " 50 " "
30 x 60 " " 25 " "
28 x 60 " " 25 " "
26 x 60 " " 25 " "
26 x 48 Greene " 25 " "
22 x 42 Wright " 10 " "
18 x 48 Corliss " wheel to suit.
18 x 36 " " "
50-ton Fly Wheel, 26 ft. diameter.
25 " " 20 ft. "
Smoke Stack, 4 ft. diameter, 60 ft. long; 3 pieces.
5 ft. " 78 ft. " 13 "
" " 80 ft. " 8 "
Surface and Jet Condensers, Fire, Feed and Vacuum Pumps; Feed Water Heaters. Write for what you need to

MARVIN BRIGGS,

12 Broadway, New York.

One 125 H.-P. Armington & Sims Automatic Engine.

Two 125 H.-P. Phoenix Automatic Compound Engines.

One 80 H.-P. Beck Automatic Engine.

One 60 H.-P. Westinghouse Automatic Engine.

10, 20, 30, 40 and 50 H.-P. Automatic Engines.

100, 200, 300 and 500 H.-P. Berryman Feed Water Heaters.

All the above in first-class condition and cheap.

FRANK TOOMEY,

131 N. Third St., Philadelphia, Pa.

SECOND-HAND RAILS FOR SALE.

In lots to suit and ready for shipment.

50 tons 20 lb. Iron T Rails.
150 tons 25 lb. Iron T Rails.
210 tons 30 lb. Steel T Rails.
120 tons 30 lb. Iron T Rail.
30 tons 35 lb. Iron T Rails.
250 tons 50 lb. Steel T Rails.
400 tons 54 lb Steel T Rails.
1700 tons 60 lb. Steel T Rails.
2200 tons 62 lb. Steel T Rails.
900 tons 70 lb New Seconds Steel.
800 tons Johnson Girder Rails, 38, 47 and 52 lb.
All in excellent condition and selected. Sound Rails of all sizes out to specified lengths for builders' use, foundations, vaults, kilns, &c. Apply to

JOSEPH JEWKES, Steel Rails,
Pittsburgh, Pa.

AT ALL TIMES

we have on hand Steam Pumps, Second-hand and New. Every Second-hand pump is tested and guaranteed before leaving shop. Write us for information, also for catalogue, circulars, prices, etc. of the celebrated "Hooker Patent Steam Pump," which we manufacture.

HOOKER-COLVILLE STEAM PUMP CO.,
St. Louis, Mo.

SOME BARGAINS HERE.

1 Hendey Shaper, 15 in. stroke, imp. vise.
1 14 x 6 Screw Cutting Engine Lathe, New.
1 5 in. hole in Turret Screw Machine and Counter, \$25
2 1/2 Hendey Cutting-off Machine. New.
1 3-Spindle Garvin Drill Press, used 1 month.
100 H.-P. Woodbury Engine. 2d-hand. Good order.
2 50 H.-P. Woodbury Boilers. Good order.
2 75 H.-P. Woodbury Boilers. Good order.
75 H.-P. Ball Engine. 2d-hand. Good condition.
Also variety of Engines, Boiler Pumps, &c.
And other machinery, new and second hand. Write for prices. Machinery Supply Company,
39, 41 and 43 Central Ave., Rochester, N. Y.

SALE OR EXCHANGE.

1 8 x 20 Lathe, Wood & Light.
1 Bolt Header, new, guaranteed.
1 5 H.-P Gas Engine, new, guaranteed.
1 10 H.-P. Gas Engine, new, guaranteed.
1 10 H.-P. Horizontal Engine and Boiler.
1 60 H.-P. Wright Engine.
1 35 H.-P. Locomotive Boiler.
1 Punch and Shears.
6 Steam Pumps, &c., &c.
H. H. MANSFIELD,
126 Liberty Street, New York.

WANTED.

To furnish reasonable estimates on specialties in light metal work.
CLARK & COWLES, Plainville, Conn.
Manufacturers of Clock Trimmings, Rivets, Springs &c.

CORLISS

And Other Automatic Slide Valve Engines, Etc.

Corliss.	High Speed auto.	Horizontal Slide Valve.	Vertical Slide Valve.
10 x 20	11 x 20	9 x 24	20 x 24
10 x 24	10 x 24	10 x 12	18 x 16
16 x 42	13 x 12	10 x 24	10 x 19
28 x 36 Horizontal Slide Valve.	11 x 20	9 x 10	
26 x 48	23 x 36	12 x 18	9 x 9
30 x 60	16 x 36	12 x 18	7 x 7
30 x 72	16 x 24	11 x 24	5 x 5

HORIZONTAL BOILERS, 3, 6 x 16; 8, 5 1/2 x 18; 5, 5 x 18; 3, 5 x 18; 1, 4 1/2 x 12, and several others.
LOCOMOTIVE BOILERS, 30, 45, 60, 100 and 150 H.-P.
One 1000 gal. Duplex Fire Pump, Brennan Crusher, Bogardus Mill, Burr Mill, Fan Blower, Platform Scales etc., etc. Send for catalogue.

G. M. CLAPP, 74 Cortlandt St., New York.

!!! FOR SALE !!!

BAKER BLOWERS, Nos. 3, 4, 4 1/2, 5, 5 1/2, 6, 7 and 7 1/2
ROOT BLOWERS, Nos. 1, 2, 3, 5, 6 and 7.
Buffalo Blowers and Heating Apparatus.
1 Corliss Band Wheel, 12 ft. x 24 in., in halves.
1 No. 9 CLAYTON DUPLEX AIR COMPRESSOR, 22 in. Steam x 24 in. Air x 30 in. Stroke. Bargain.

A Variety of Machinery, very cheap.

Do you want to buy or sell Machinery? If so, write

C. R. BIGELOW, Machinery Expert,

45 Dey St., New York City.

FOR SALE. SECOND-HAND IRON PLANING MACHINES.

30 in. x 31 in. x 10 ft., A1 Order.

NEW PLANERS.

22 in. x 22 in. up to 120 in. x 120 in., ANY LENGTH.

FROG AND SWITCH POINT PLANERS, LOCOMOTIVE CONNECTION ROD PLANERS, GLOBE VALVE PLANERS.

THE POWELL PLANNER CO.,
Worcester, MASS.

FOR SALE. SECOND-HAND.

ENGINES, Horizontal and Vertical. All types and sizes up to 2000 H.-P.

BOILERS, Vertical and Horizontal and 3 Batteries of "Heine" water tube.

MILLS, 3 high, 12 in., 20 in., 30 in. and 36 in. 1 Reversing 32 in. Blooming Mill complete.

STEAM HAMMERS. Various sizes up to 10 ton.

SHEARS. Cut from Bands to Blooms and one to cut Plates 1 1/4 in. thick, 90 in. long.

SQUEEZERS, ROLL LATHES, CRANES, GRINDING PANS, MACHINE SHOP TOOLS, &c.

LOCOMOTIVES. Fine condition, various sizes and gauges.

"If you don't see what you want, ask for it" of

B. M. EVERSON,

301 Smithfield St., Pittsburgh, Pa.

DON'T INVEST in expensive tools or machinery or let a contract before getting our estimate for making novelties or parts. Fine, difficult and accurate parts a specialty. White metal work at prices that cannot be duplicated. Inventions perfected. Models made. Secrecy and satisfaction guaranteed, and no extra charge for new ideas or improvements. To insure reply to letters of inquiry only, enclose stamp. THE H. H. FRANKLIN MFG. CO.,
Syracuse, N. Y.

FOR SALE.

CRANK and GEARED SHAPERS.

Write us for Bargains.

J. STEPTOE & CO. Cincinnati, O.

FOR SALE.

One 75 H.-P. Cummmer Engine.
Two 16 H.-P. Westinghouse Junior Engines.

One 15 H.-P. Baxter Engine and Boiler.
Can be seen running at our factories.

TURNER & SEYMOUR MFG. CO.,
Torrington, Conn.

WANTED.

Responsible parties to manufacture and sell on royalty, a cheap portable steel or iron **CULVERT BRIDGE**; it is adapted to all small streams, runs, etc., in roads, streets, **RAILROADS**, etc.; improved roads is the order of the day; use this bridge, put it below the level of the road, cover it over and thus prevent jarring and wear and tear of vehicles, etc. Apply to
W. A. NICHOLS,
Girard Building, Philadelphia, Pa.

SECOND-HAND MACHINERY.

4 11 in. x 5 ft. Engine Lathes, Reed and Prentice.
 2 12 in. x 5 ft. Young Speed Lathes.
 2 15 in. x 6 ft. Reed Engine Lathes, R. & F. & P. K.
 6 16 in. x 6 ft. Engine Lathes, Young, Reed, Blaisdell and Flather.
 2 18 in. x 8 ft. Engine Lathes, New Haven and Dustin.
 4 20 in. x 6 ft. and 8 ft. Engine Lathes, Bullard.
 1 20 in. x 8 ft. Pattern Lathe and Floor Stand.
 1 20 in. x 6 ft. Bullard Turret Lathe (C), Power Feed.
 4 Brainard No. 7 Millers, 3 with arm.
 1 Brainard Heavy No. 6 Lincoln Pattern Miller.
 1 Brainard No. 15 Universal Miller.
 2 Brainard No. 5 Universal Millers.
 1 B. & S. No. 1 Universal, complete.
 8 Garvin Millers, Nos. 2, 3, and 4.
 1 Blaisdell 30 in. Single Spindle Drill.
 1 Garvin 1 Spindle Trolling Machine.
 1 Sensitive Drills, Slate, 1 2 and 3 spindle.
 1 20 in. 38 in. Wood & Light Gap Drill.
 2 P. & W. Drills, 1 and 2 spindle.
 6 Bench Drills, capacity 5-16 in.
 2 Suspension Drills, Pond, heavy.
 2 Punch Presses, 1 Wilder and 1 Stiles.
 2 Garvin No. 2 Wire Feed and Plain Screw Machines.
 1 Garvin Small Gear Cutter.
 1 Bullard 15 in. Stroke Shaper.
 1 6 in. B. & P. Shaper, Hand and Power.
 2 Bolt Cutters, 1 1/2 capacity.
 6 Speed Lathes, Garvin and Young.
 1 No. 4 Diamond Grinder.
 1 Forge.
 1 27 x 27 x 6 ft. English Screw Planer.
 1 8 ft. Vertical Boring Mill, 2 heads and pulley attach.
 1 30 x 30 x 8 ft. Niles Planer.
 1 Bement Axle Lathe, Single.
 1 36 in. x 13 Engine Lathe.

ALSO LARGE STOCK NEW TOOLS.**THE NILES TOOL WORKS CO.,**

Eastern Branch, 136, 138 Liberty St., N. Y. City.

New York Agents PRATT & WHITNEY Co.

FOR SALE, CHEAP.

400 tons of 60 lb. Rails, 75 tons of 25 lb. Iron Rails, 400 tons of 35 lb. second-hand Iron Rails with fastenings, one 4 horse-power Engine and 8 horse-power Boiler. Also other Engines and Locomotives, second-hand. Sawed and Cut Rails a specialty.

J. H. RICHARDSON & CO.,
Pittsburgh, Pa.

BARGAINS, SECOND-HAND.

The following tools have been carefully overhauled and placed in perfect order, and are bargains.

12 in. x 5 1/2 and 14 x 6 Engine Lathe.
 13 in. x 7 and 15 x 7 Engine Lathes. P. C. and Rod Feeds.
 16 x 6 Porter Lathe, Compound Rest.
 18 x 10 Engine Lathe, P. C. Feed.
 24 in. B. G. Drill Press.
 24 x 24 x 8 Planer.
 New 10 in., 13 in., 15 in., and 22 in. Eng. Lathes.
 Planers, Shapers, Drill Presses, &c.
SEBASTIAN LATHE CO.,
 113-115 Culvert St., Cincinnati, Ohio

CUPOLA.

For sale, 6-ton "Bement" Foundry Cupola.

CRANE.

For sale, 5-ton cap. "Yale" Traveling Crane.

G. W. SCHULTZ & CO.,
308 Walnut St., PHILADELPHIA.

SECOND-HAND I-BEAMS FOR SALE.

We have for sale 500 to 1000 tons of Steel Beams 15 inches high, 20 to 32 feet long, 60 lbs. per foot. The beams are painted, not rusty, perfectly straight, as good as new. Have been used about eight months. Will sell at a reasonable price according to quantity taken. Call or address at once,

SWARTS IRON & METAL CO.,
Chicago's Leading Scrap Iron House,
551 to 557 S. State St.,
CHICAGO, ILL.

WANTED. ROLL LATHE.

50 in. swing, 16 ft. bed or larger. Must be in good condition; state price. Address BOX 716, office of *The Iron Age*, 59 Dearborn St., Chicago.

WRITE FOR STOCK LIST

OF

Shafting, Pulleys, Hangers, Boxes, Belting, Couplings,

USED AT THE WORLD'S FAIR.

The Belting is of the Best Quality, and the Shafting, Pulleys, Hangers, etc., are of the Highest Grade, and all of the material was in use such a short time that it is practically as good as new. This list comprises the entire outfit used in Machinery Hall, Transportation and Electrical Bldgs.

Now stored in our warehouses
at Saginaw, Mich.

FOR PRICES ADDRESS

WICKES BROS.,

SAGINAW, MICH.

A Bargain.

A FINE

Business Opportunity

for a live business man or two partners who have \$25,000 to invest in a first-class, old, well established and well located

JOBGING and RETAIL HARDWARE

business, which did not lose money last year.

STOCK IS WELL ASSORTED.

Good location in large Eastern City. Reasonable lease of premises can be continued. This will bear full investigation. Parties who can command above amount of capital address

"BARGAIN," Box 315,
office of *The Iron Age*, 96-102 Reade St., N. Y.

LODGE AND DAVIS

Machine Tool Co., Cincinnati, O., U. S. A.,

Have for sale a large line of first-class second hand Engine Lathes, Planers, Shapers, Drill Presses, Milling Machines, &c.

WRITE FOR LIST AND PRICES.

RECEIVER'S SALE. STRUCTURAL IRON WORKS. BIDS INVITED.

The entire Plant, fully equipped and ready for immediate operation, of the Riverside Bridge & Iron Works, situated at Paterson, N. J. (16 miles from New York City), and admirably located on the main line of the N. Y., L. E. & W. R. R., with switch connection. Area nearly 30 city lots. Plenty of skilled labor, strikes never have occurred. Facilities for handling the heaviest as well as light work. Will be sold at a great sacrifice and on easy terms. A RARE OPPORTUNITY to embark in a business with little capital that promises great results, considering the low price of iron and cheapness of capital. Address for full particulars

J. ALBERT VAN WINKLE, Receiver,
P. O. Box 34, Paterson, N. J.

N. B.—Remnant of stock of material, consisting of shapes, bars, rivets, bolts, &c., is offered for sale. Stock list can be had on application to receiver.

PITTSBURGH SALES AGENCY,

J. H. HILLMAN, Manager,
No. 8 Wood St.,
Pittsburgh, Pa.,

IS NOW ENGAGED IN THE

Sale AND Reorganization —OF—

Manufacturing Plants,

INCLUDING

Blast Furnaces, Rolling Mills, Machine Shops, Foundries, Agricultural Works, and Manufacturing Establishments Generally.

Dealers in Coal and Iron Lands.

Examinations and Reports
on Properties.
References on Application.

FOR SALE OR LEASE.

New York City Rolling Mill, foot of East 23d street. Modern plant, consisting of three high 18 in. Muck Mill and 10 in. Finishing Mill, with Rolls to make 3/4 in. to 2 in. round or square, 3/4 in. to 3 in. flat, thick or thin sizes; two heating and one busheling or puddling furnace. Excellent location. Large trade in Merchant Bar and H. S. Iron, cheap scrap. Particulars and satisfactory reasons for disposing by personal interview only.

J. F. HANLEY,
502-506 East 23d St., New York.

100 CITIES AND TOWNS WANTING INDUSTRIES

Is the title of a pamphlet issued by the Illinois Central R. R. Co. If you are thinking of making a change in location and are not well informed as to the advantages of locating either in the West or South, write for a copy. If you want in a nutshell the

SALIENT POINTS OF OVER 100 PLACES

on the line of the Illinois Central and Yazoo & Mississippi Valley Railroads, giving the population, city and county debt, death rate, assessed valuation of property, tax rate, annual shipments, raw materials, industries desired, etc., apply to the undersigned. Our line is in the shape of the figure "7" and runs from Sioux Falls, S. D., and Sioux City, Ia., to New Orleans, passing through South Dakota, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Kentucky, Tennessee, Mississippi and Louisiana, and has

NEARLY EVERY KIND OF RAW MATERIAL

used in manufacturing, together with populous sections which are large consumers of the manufactured product. To sound industries which will bear investigation, substantial inducements will be given by many of our places, and they will be welcomed heartily by the different sections traversed by the Illinois Central and Yazoo & Mississippi Valley Railroads. For all information on the subject, address

GEO. C. POWER,

Industrial Commissioner I. C. R. R., Central Station, Chicago, Ill.

A DOUBLE CUTTING Paper Roll Cutter

Patent just issued and for sale. Cuts the Paper both ways. Adjustable to any width Paper. Requires no rod to hang roll in cutter. Made partly of wood and iron or all iron. Copy of Patent sent on application. Address

THOMAS GASKINS,
Arcadia, DeSoto Co, Florida.

A N OLD ESTABLISHED hardware house in New York, whose salesmen cover the entire United States, wants the sole agency of American manufacturers of Chains, Toilet Clippers, Locks, Files, Carpenters' Tools and similar articles. Address

"W. B. G.," No. 105,

office of *The Iron Age*, 96-102 Reade St., New York.

TO MANUFACTURERS AND IMPORTERS.

A man of energy and business qualifications, who has been in the hotel business for twenty years, intends establishing, in a live and growing city of over 100,000 inhabitants, an agency for several lines of trade which will not conflict. To this end he solicits correspondence from Manufacturers, Importers and Jobbers. Satisfactory references and if business requires bond will be given. Please address

W. F. TOWNSEND,

P. O. Box 183, Syracuse, N. Y.

PUBLIC SALE

—OF—

THE BRANFORD LOCK WORKS.

Pursuant to the order of the Superior Court for the County of New Haven, in the State of Connecticut, the undersigned will sell at public auction, at the office of the Branford Lock Works, in Branford, Conn., at ten o'clock, A. M., on Saturday, April 14, 1894, the entire property of said Lock Works, as a going concern, including the real estate, machinery, tools, fixtures, patterns, materials, stock, accounts, and all of its other assets of every kind, to the highest bidder.

This offer of sale is subject to the condition that no bid will be considered the amount of which is not sufficient to cover all claims against the said Lock Works Company, including Receiver's charges. The total amount of said claims and charges is now estimated at about \$81,000. The sum required to be bid can be learned from the undersigned on or after April 4. The terms of payment are fifteen per cent. of the purchase price at the time of sale and the balance within twenty days thereafter. Information concerning said property may be had by application to the undersigned at the address given below.

HENRY C. WHITE, Committee,
828 Chapel St., New Haven, Conn.

WANTED,
to make arrangement with
**Railroad and Machinist
SUPPLY HOUSES
AND DEALERS IN
HEAVY HARDWARE**
to sell a new
CHAIN BLOCK.

This block is the best in the market and outclassed all others. Only wrought iron, steel and gun metal used in its construction. Address
"CHAIN BLOCK,"
office of *The Iron Age*, 96-102 Reade St., N. Y.

TO RENT In Center of Hardware District.

On May 1, 1894, I will remove to 88 Chambers Street and will rent part of store and basement and entire sub-cellar. Front of store will be entirely remodeled and improved. Immediate possession if desired. Apply to

R. CHRISTENSEN,
90 Chambers St., N. Y.

FOR SALE.

- 1 Corliss Engine, nearly new; 250 H.-P.
- 20 in. x 30 in. Wright Automatic Engine.
- 3 60 H.-P. Armstrong & Sims Engines.
- 1 Blake Crusher and 2 Elevator Engines.

WILSON & ROAKE,

Front and Dover Streets, New York City.

Collections!

ATTENTION! Merchants and Manufacturers.—We collect your past due accounts. Do not let them remain too long upon your books. Send for our draft book.

THE HARDWARE BOARD OF TRADE, Ltd.
4 and 6 Warren street, New York.
JAS. H. GOLDEY, Treas.

A GOOD BUSINESS FOR SALE.

For settlement of an estate, it is necessary to dispose of a well established and profitable jobbing and retail business in the hardware, plumbing and machinery line, located in Albuquerque, New Mexico. Goods sold all over Central New Mexico and Northern Arizona. Full information and references furnished by mail, and business and books open to personal examination. Location the best in the United States for invalids suffering from pulmonary trouble. Address Lock Box No. 558, Albuquerque, N. M.

A FINE CHANCE

to invest in a splendid Hardware business in the finest little city in the West. Stock clean and neat, consists of Hardware, Stoves, Crockery and a general line of House furnishing goods. A change upward in prices will soon take place, therefore, now is "the time to invest." Address
"FINE CHANCE,"
office of *The Iron Age*, 96-102 Reade St., N. Y.

A RARE CHANCE

to secure an established Machine Tool business in New England, with a good supply of orders, is offered by the advertiser, who must give preference to other interests. Tools, stock, etc., will be sold at a bargain.

Address
"E."

office of *The Iron Age*, 146 Franklin Street, Boston, Mass.

— THE —

Very Desirable Second Loft
No. 99 CHAMBERS STREET,
CORNER OF CHURCH, 25 X 100 FEET,
TO RENT,

from May 1st. Light and airy. Entrance on Chambers Street, with steam elevator on Church Street.

THE AMERICAN WRINGER CO.

FOR SALE.

Entire plant of the Union Saw Co., including all machinery, tempering furnaces, etc., necessary for the manufacture of hand saws, etc., or advertiser will consider proposition of partnership. Address

2024 S. Sixteenth St., Phila., Pa.

RELAYING RAILS FOR SALE.

I have on hand and for sale about 500 tons of 35 lb. Tee Iron Second-hand Rails with splices. Only used a short time and in excellent condition to relay. For prices address

W. F. BRONSON,

Painted Post, N. Y.

THE GLEASON- BRANSON BICYCLE.

To the readers of *The Iron Age*.

The bicycles which have been made embodying this invention have given every satisfaction and I feel certain that no live maker can dispense with the modern principle found in this invention, as it has been proved that no ROAD-STER is perfect without it. Several first-class manufacturers want to use this invention and later you may hear from them through *The Iron Age* and other first-class Journals, as I feel like letting all our first-class manufacturers have license to use this invention.

Yours, etc. JOHN BRANSON,
2221 N. Front St., Philadelphia.

Trustee's Sale of Machine Shop Equipment.

Lathes, 52 in. swing, 41 ft. bed; 30 in. swing, 22 ft. bed. One Pit Lathe. Drills, 36 in. upright, 5 ft. post drill, Horizontal Drilling Machine. Engines, 5 new and 7 second-hand, from 100 H.-P. down. Cranes, 15 ton Gib Crane, 30 ft. high; 12 ton Gib, 18 ft. high. Building, extra heavy timbered, 70 ft. span, 100 ft. long, fit to remove, two storied, iron clad. Hundreds of Iron Pulleys and Fly Wheels, Hangers and Shafting. Address

W. A. BOLE, Trustee,

Liberty Ave., cor. 25th St., Pittsburgh, Pa.

FOREIGN AGENT.

Gentleman with many years' experience in the Cut ery line now located as per address below, is desirous of corresponding with houses in the United States who import cutlery, with a view of buying for such houses. First-class references given. Address

B. KAUFMAN,
No. 5 Goldstrasse, Solingen, Germany.

FOR SALE.

Hardware store and Tin shop in growing railroad town. Address
LOCK BOX 175,
Grand Valley, Warren Co., Pa.

MANUFACTURERS' WISHING
to be represented in Western New York and Pennsylvania by first-class parties in the Hardware line please correspond through "MANUFACTURERS' AGENTS," No. 412, office of *The Iron Age*, 96-102 Reade St., New York.

FACTORIES TO LET.

At Orangeburgh, New York, 21 miles from New York City, on the West Shore and Erie Railroads, with switch from each road. Two new one-story brick buildings, 75 ft. x 130 ft., built on the most approved modern plans. Will be let, with electric power, either singly or together. This location is unsurpassed for manufacturing purposes. For further information apply to
T. T. P. LUQUER, Agt.
45 Broadway, New York.

WANTED.

Stocks of Hardware in exchange for improved and unimproved farm lands in Iowa, Nebraska and South Dakota. WILLARD L. FROST,
Sioux City, Iowa.

WANTED.

To buy 3 or 4 carloads of second-hand pipe. Must be in good order, ranging from 1 to 2½ inches. Also a few 3 inch pipe. Please state the lowest price delivered at Syracuse. Apply

T. MUSCAT,

Syracuse, N. Y.

TO LET.

Store on the principal hardware street in New York, with or without fixtures. Or a portion of the same.

19 WARREN STREET.

CONNECTION WITH

American Tin Plate manufacturers of first-class capacity wanted by a gentleman against English competition for the American trade. Address P. H. Petry & Co., 23 So. William St., N. Y.

IMPORTANT AUCTION SALE OF Safety Bicycles.

E. Bissell, Son & Co.,
AUCTIONEERS.

THURSDAY, APRIL 19th, at 11 O'CLOCK,
At No. 12 Murray St. and 15 Park Pl., N. Y.

Absolutely Unreserved Sale

**ABOUT 200 MEDIUM AND HIGH GRADE
AMERICAN AND ENGLISH CUSHION
AND PNEUMATIC TIRE SAFETY BI-
CYCLES.**

The line of Wheels to be sold are all of Standard make, comprising in part Eagle, Altair, Smalley, Rudge, Ormonde, American and English Scorchers, Ramblers, Clipper, Luxury, Crescent, Gazette, Reading, Triangle, Jewel, Duco and other well known makes.

This sale is worthy of the attention of the trade, and persons desiring to purchase a first-class wheel at their own price.

Bicycles on Exhibition Wednesday, April 18.

WANTED.

To buy all kinds of scrap iron, steel and old metal, second-hand straight pipe and old machinery. Apply

T. MUSCAT,

Syracuse, N. Y.

FOR SALE.

Well established Iron Foundry with complete stock of Patterns for Plumbers' Goods and for other castings. Present owner wishes to retire on account of other business, but will retain heaviest consumer. Terms easy. Splendid opportunity for enterprising party. Address "FOUNDRY,"

office of *The Iron Age*, 220 S. 4th St., Phila., Pa.

New York Representative

With ample facilities for carrying stock, long experience and a location in the center of the hardware district, I desire to represent in New York and surrounding territory, on salary or commission, manufacturer of goods for the hardware trade.

R. CHRISTENSEN,

88 Chambers St., N. Y.

SITUATIONS WANTED.

*Undisplayed Advertisements for
Situations Wanted not exceeding fifty
words Fifty Cents each insertion.
Additional words one cent each.*

BY A YOUNG MAN age 23 who has had three years' experience in the wholesale and retail hardware business, position to go on the road or otherwise; can furnish good references. Address "Y. A. J." No. 412, office of *The Iron Age*, 96-102 Reade St., New York.

BY A HARDWAREMAN; seventeen years' experience in builders' hardware, iron, steel, tinware, etc.; a man of family, good habits and health; wants position to represent on Pacific Coast Eastern manufacturer or wholesale house; well acquainted with part of the country and trade; willing to travel; responsible and can furnish bond. Address "J. W. A.," care E. S. Adams, office of *The Iron Age*, 312 The Cuyahoga, Cleveland, Ohio.

BY YOUNG MAN; six years' experience in wholesale builders' hardware; desires position where by strict attention to business he can advance himself; first-class references given. Address "BUILDERS' HARDWARE," Box 412, office of *The Iron Age*, 96-102 Reade St., N. Y.

A BLAST FURNACE CHEMIST wants a position at anything in the iron business where hard work and faithful services will be appreciated; salary secondary consideration if prospects are good. Address "TARIFF," office of *The Iron Age*, 96-102 Reade St., New York.

BY A HARDWAREMAN of twenty years' experience; competent to take charge of a wholesale or retail business in any capacity; references of the highest. Address "YEARS' EXPERIENCE," office of *The Iron Age*, 96-102 Reade St., New York.

A MECHANICAL ENGINEER of wide knowledge and experience is at liberty for engagement; for further particulars address "WELL QUALIFIED," office of *The Iron Age*, 96-102 Reade St., New York.

A YOUNG MAN, for several years connected with the engineering department of one of Philadelphia's largest manufacturing concerns, would like to establish an agency for Philadelphia and vicinity for the sale of the product of an iron works or other manufacturing business; the advertiser has the advantage of an intimate personal acquaintance with the prominent iron firms, electric railway people and the iron market in general. Address "AGENCY," office of *The Iron Age*, 220 S. 4th St., Philadelphia.

A YOUNG MAN of good mechanical ability would like to engage with large firm as superintendent; has ten years' experience on sheet iron and tin work, steam and hot water fitting; thoroughly understands laying out work from plans, also good draughtsman and designer of special work; terms moderate; strictly temperate and reliable. Address J. P. LISK 636 Monroe St., Brooklyn, N. Y.

RESPONSIBLE position by competent mechanical engineer, energetic, fully familiar with best shop practice, with estimating, designing and building medium and heavy machinery for any purposes and structural work, as iron and steel works, rolling mills, mining plants, &c.; held independent positions before; best references. Address "VOLKKOMMER," 1149 N. Clark St., Chicago.

AN ACTIVE, ENERGETIC business man of 30 years' experience, now selling specialties to jobbers and retailers of hardware and to department stores in New York and principal Southern cities, desires to represent one or more first-class manufacturers of specialties suitable to those trades or to gas and steam fitters; can command capital for the right thing if necessary. Address "S. B.," Box 412, office of *The Iron Age*, 96-102 Reade St., N. Y.

BY A thorough Hardware Salesman, experienced in store and on the road in all lines of general hardware, cutlery, guns, &c. made; builders' hardware and cutlery specialties. Address "EXPERIENCE," office of *The Iron Age*, 59 Dearborn St., Chicago.

AMERICAN aged 35, with many years' experience as a correspondent, credit man, salesman and manager of a corporation whose business is with the stove, hardware and kindred trades, is open for an engagement with a live house requiring an efficient and reliable man as manager or New York representative. References AL "WHOLESALE," No. 45, office of *The Iron Age*, 96-102 Reade St., New York.

TO BRASS FOUNDERS.—A thoroughly practical foreman molder, with large and varied experience, well up in melting and mixing of metals to suit every description of work; for years at the Delamater Iron Works, New York City; electrical work and copper castings a specialty; can give best of references; machinery jobbing shop preferred. Address "H. P. A.," Citizens National Bank, Yonkers, N. Y.

A TRAVELING SALESMAN with 12 years' experience in hardware lines on the road wishes a position to represent first-class house, or would arrange with manufacturer to handle line of goods on commission, or specialties of merit; reference in N. Y., or the field if desired. Address M. Q. LEE, care Jefferson House, Toledo, Ohio.

YOUNG MAN, 24, excellent penman, with a knowledge of mechanics and two years' experience in the office of a large brass copper rolling and seamless tubing mill desires a position eventually as a salesman in some similar metal line; unquestionable references from present employer for character; honesty, etc. Address "METAL PRODUCER," office of *The Iron Age*, 96-102 Reade St., New York.

AN ACTIVE BUSINESS MAN, with 15 years' practical experience in the management of iron properties, rolling mills, and manufacture of bars, shapes, sections, sheets and general merchant iron and steel, desires a position; can furnish best of references. Address "M. A. W.," office of *The Iron Age*, 501-510 Hamilton Building, Pittsburgh, Pa.

BY A MECHANICAL and HYDRAULIC Engineer; experienced designer of hydraulic plants for the manufacture of solid drawn seamless steel tubing (for bicycles, boilers, hydraulic presses, &c.), gas and air vessels, shells and hydraulic forgings; competent to manufacture said articles; highest references. Address "HYDRAULIC," office of *The Iron Age*, 96-102 Reade St., New York.

SELLING AGENCY WANTED, for blast furnace and iron and steel works products, by a gentleman having extensive acquaintance among railroads, foundries and shops. Address "AGENT," No. 111, office of *The Iron Age*, 96-102 Reade St., New York.

FORCE of traveling salesmen of a house of highest rank, open for special work or side lines during ensuing six months. Experienced in implements, hardware, bicycles, etc. Cover thoroughly the Ohio Valley, Southern and Southwestern States. Address "EXTRA CAPACITY," care Bradstreet's, Louisville, Kentucky.

A MEMBER OF AMERICAN SOCIETY of Mechanical Engineers, who has had 20 years' practical experience as follows: machinist, head draughtsman, erector of steam plants, engineering, estimating, contracting and office work and superintendent of large engine works, is available for responsible position. Address "ENGINE WORKS," No. 16, office of *The Iron Age*, 96-102 Reade St., New York.

HELP WANTED.

*Undisplayed Advertisements for
Help Wanted not exceeding fifty
words One Dollar each insertion.
Additional words two cents each.*

A GOOD SALESMAN for a retail hardware store. Address, stating experience, references and salary wanted, LOCK BOX 59, Dover, New Jersey.

WIRE NAIL SALESMAN, thoroughly acquainted with small trade in Massachusetts; give age, experience, references and salary expected. Address "JOBBER," No. 412, office of *The Iron Age*, 96-102 Reade St., N. Y.

THE LATEST BOOKS.

Art of Coppersmithing. By JOHN FULLER, Sr. A Practical Treatise on Working Sheet Copper in all Forms. This work, prepared at great labor and expense, is reproduced from *The Metal Worker*, and forms an exhaustive treatise on the Coppersmiths' Art, being the only volume on that subject that has been published. It is beautifully illustrated with 474 pen and ink drawings, and is bound and printed in the best manner. 327 pages, 474 illustrations, 7 x 10 inches, cloth.....\$3.00

Concrete, Its Nature and Uses. By GEORGE L. SUTCLIFFE. A Book for Architects, Builders, Contractors and Clerks of Works. 8vo, cloth, illustrated.....\$3.00

The Modern American Pistol and Revolver. By RALPH GREENWOOD (A. G. GOULD). Entirely new edition. Very fully illustrated. 8vo, cloth.....\$1.50

A Text-Book on Gas, Oil and Air Engines; or Internal Combustion Motors without Boiler. By B. DONKIN. 136 illustrations, 434 pages, 8vo, cloth.....\$8.40

A Treatise on the Kinetic Theory of Gases. By H. W. WATSON. Second edition, revised and enlarged. 12mo, cloth.....\$1.00

Engineering Drawing and Design. By S. H. WELLS. A Manual for Technical Schools and Colleges. With numerous illustrations prepared expressly for the work. Part I.—Practical Geometry, Plane and Solid. Part II.—Machine and Engine Drawing and Design. 2 vols, 8vo, cloth.....\$2.50

Lamp Primer, or Lamp Light and Lamps, and How to Care for Them. By JOHN JOSEPH BURY. 12mo, flexible cloth.....\$0.50

The Theoretical Elements of Electro-Dynamic Machinery. By A. E. KENNELLY. 8vo, cloth.....\$1.50

The Illustrated Architectural, Engineering and Mechanical Drawing-Book. By R. S. BURN. For the use of school students and artisans. Tenth edition. 155 pages, 8vo, cloth.....\$1.00

Machine Construction and Mechanical Drawing. By T. CRYER and H. G. JORDAN. Fifth edition, revised and enlarged. 4to, cloth.....\$1.20

The Electric Transformation of Power and its Application by the Electric Motor, Including Electric Railway Construction. By PHILIP ATKINSON. Illustrated. 12mo, cloth.....\$2.00

Helical Gears. A practical Treatise. By a Foreman Pattern-maker, author of "Pattern-making," "The Principles of Fitting," etc. Illustrated with 100 engravings and frontispiece. 12mo, cloth, 127 pp.....\$2.00

A Manual of Practical Assaying. By H. VAN F. FURMAN, E.M. 8vo, cloth.....\$3.00

Pigments, Paint and Painting. By GEORGE TERRY. A Practical book for Practical Men. 12mo, cloth, 392 pp. Illustrated.....\$3.00

Depreciation of Factories, Mines and Industrial Undertakings and their Valuation. By EWING MATHESON. Second edition. 143 pages, 8vo, cloth.....\$3.00

Notes on Cylinder Bridge Piers and the Well System of Foundations. By JOHN NEWMAN. Especially written to assist those engaged in the construction of Bridges, Quays, Docks, River Walls, Weirs, &c. 136 pages, 8vo, cloth.....\$2.50

Metal Working for Amateurs. Edited by FRANCIS CHILTON YOUNG. In 3 parts. Part 1, Brazing and Soldering, by G. Edwinton. Part 2, Practical Gas Fitting, by E. W. Denniss. Part 3, Brass Casting at Home, by F. J. Durrance. Illustrated with numerous diagrams, explanatory sketches and working drawings. 110 pages, cloth.....\$0.40

The Incandescent Lamp and Its Manufacture. By G. S. RAM. 218 pages, 8vo, cloth.....\$3.00

Sent, postpaid, on receipt of price by

DAVID WILLIAMS, Publisher and Bookseller,

96-102 Reade Street, New York.

THIRD REVISED EDITION. THE IRON AGE STANDARD HARDWARE LISTS FOR USE IN PRICE BOOKS.

Compiled by R. R. WILLIAMS, Hardware Editor of The Iron Age.

This pamphlet contains the principal standard Hardware price-lists in as clear and compact an arrangement as possible, so as to permit their being advantageously cut out and inserted in the price book. In order to make them adapted to this use they are printed on thin and tough paper of fine quality and on only one side of the paper.

Saucepans and Round Boilers.

Pints.	Plain	Turned.	Tin'd or En'd.
1	\$0.30	.35	.39
1½	.32	.37	.44
2	.35	.39	.48
3	.42	.47	.56
Quarts.			
2	.50	.56	.63
2½	.53	.59	.68
3	.55	.62	.73
4	.60	.68	.84
5	.65	.75	.96
6	.70	.81	1.11
7	.75	.84	1.21
Gallons.			
2	.85	.96	1.31
2½	1.05	1.18	1.56
3	1.20	1.35	1.70

The success of the effort to give the lists in small space is illustrated in many of the lists, in which a clear and condensed arrangement is secured. For instance, the wrench list occupies but 3 inches by ¼ inch, while the list of Stove Hollow Ware, in very small space, gives the list prices on a large and important line of goods which often occupy several pages in catalogues. In several lists, such as Strap and T Hinges and Butts, a new arrangement is adopted, which is regarded as presenting these lists in a very convenient as well as condensed form.

As is obvious from the lists herewith reproduced, the shape and size of the different lists varies greatly, the aim being to give each list the smallest and most convenient arrangement possible. None of the lists are, however, more than 3¼ x 6 inches in size, very few of them being as large as this and most of them very much smaller. In use it is intended that they shall be trimmed closely before they are inserted in price books,

when they may be attached either by one edge close to the hinge of the book, as will, perhaps, be most convenient with the larger lists, permitting the use of the entire page for memoranda, or the smaller lists may be pasted on the page in connection with the entries in regard to discounts, freights, &c. Many of the lists are so compact in arrangement as when thus inserted to leave ample room for recording quotations.

Wrenches.

Inches.	6	8	10	12	15	18	21
Black...	\$9.00	\$10.00	\$12.00	\$14.00	\$24.00	\$30.00	\$36.00
Bright..	10.00	11.00	14.00	16.00	26.00	32.00	38.00

Standard List.

Some merchants use this pamphlet for reference, checking off invoices, etc., as it gives the leading lists in a more convenient form than they can otherwise be obtained. The lists are, however, intended primarily to be cut out

and inserted in price books, and can be used in connection with any of The Iron Age Hardware Price Books.

That the Standard Hardware Price Lists meet a want of the trade is evident from the fact that a Third edition is already called for.

EVERY HARDWAREMAN SHOULD HAVE A COPY. Price 25 cts.

Sent, postpaid on receipt of price by DAVID WILLIAMS, Publisher, 96-102 Reade Street, New York.



The Scattergood
Time Record and
Pay Roll Book.
(Pat. Oct. 13, 1891.)
Address for Circular to
HENRY W. SCATTERGOOD,
23 Richmond St., Phila., Pa.

KEEP BOOKS

by WEST'S New Original-ENTRY LEDGER.
Make the same entry but once. A Ledger in place of a full set of books. Convenient forms for all entries. Easily applied, simple, saves time. West's Self-Proving Balance locates every error. Send 3 2-cent Stamps for illustrated 16-page pamphlet.
WOLCOTT & WEST, Syracuse N. Y.



J. Popping's
Patent Machine
and Tool Wks.

MANUFACTURERS OF
Solid Iron Shoulder Rabbet Planes, etc., etc., and
Hofstatter's Patent Hair Picking Machine.
N. E. Cor. 58th St. and 11th Ave., N. Y.

SPECIAL

And Automatic Machinery and Tools for reducing cost of manufacturing machines, parts of machines, articles of hardware, &c., designed and built. Tools, models and experimental work. Estimates given. Correspondence solicited.

IDEAL MACHINE WORKS,
P. O. Box 655 Hartford, Conn.

The L. E. Rhodes Co.,
HARTFORD, CONN.,

Contracts to make

Special Machinery

—AND—

Hardware Specialties.

CRUCIBLE STEEL CASTINGS.

Why send your PATTERNS EAST and WAIT FOUR WEEKS for your CASTINGS when you can get

SOLID STEEL CASTINGS

at home PROMPTLY? Answer

THE KING & ANDREWS CO.,

No. 218 N. Union Street, CHICAGO, ILLS.

FOR NUMBERING AND LABELING
Boxes, Drawers and Shelves
In Hardware Stores and Factories.

Send for sample and description of our Handy Box of small gummed Letters and Figures, intended for labeling shelf boxes. Put up especially for the Hardware trade.

THE TABLET AND TICKET CO., Mfrs.,
87-89 Franklin St. 99 Franklin St.,
Chicago. New York.

**WILLSON'S
PAPER
LETTERS**



THE BOMMER PATENT
COMPOUND SPIRAL SPRING HINGES

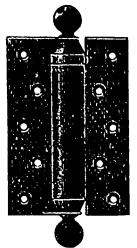
Are Made of

WROUGHT STEEL,
BRONZE AND BRASS.

Also of cast metal in all the finishes known to the trade.

BOMMER BROTHERS,

351 and 353 Jay Street, - - BROOKLYN, N. Y.



NOW is the time to INVEST in
SOUTHERN TIMBER-
MINERAL LANDS,

Before prices advance. All kinds of mines for sale.

E. C. ROBERTSON,

Terms Easy. CINCINNATI, O. Titles Perfect

ALSITE SOLDER
FOR
ALUMINUM.

Does not disintegrate. The butt joined can be rolled, hammered or drawn. Full particulars on application.

ALSITE ALUMINUM CO.,
106 Liberty St., New York.

The Art of Coppersmithing.

A Practical Treatise on Working Sheet Copper into all Forms.

BY JOHN FULLER, SR.

CLOTH BOUND, 10x7 INCHES, 327 PAGES, 474 ENGRAVINGS.

PRICE, - - \$3.00.

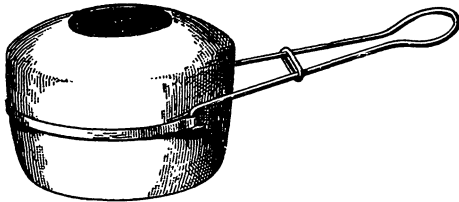


Fig. 108.—Clamp for Holding Tea Kettle, while Being Tinned.

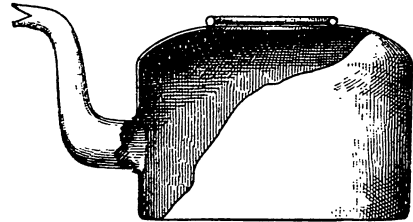


Fig. 110.—Tea-Kettle, Showing Spout Attached.



Fig. 107.—Planishing Tea Kettle Side.

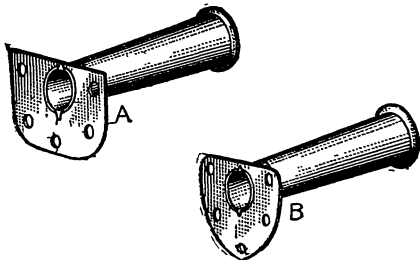


Fig. 54.—Way to Put the Flaps On.

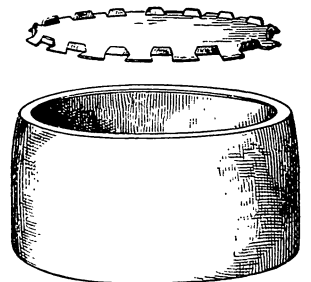


Fig. 105.—Putting in Bottom.

The above are Specimen Illustrations from "The Art of Coppersmithing," and indicate the Practical Nature of the Treatise, and how it Goes into All the Details of Workmanship.

CONTENTS:

Historical Sketch of Copper; Braziers' Art, or Light Coppersmithing; First Year's Experience; Repairing and Tinning; The Boy's Second Year; Making Washing Coppers; Making Small Brewing Coppers; Table of Dimensions and Capacity; Making Hand Bowls; Making Frying Pans; Making Closet Pans; Making Water Balls; Mounting for Copper Goods; Glue Pots and Tea-Kettles; Oval Tea-Kettles; Beer Mullers; Funnels; Coffee Pots; Saucepans and Pudding Pots; Stewpans; Stock Pots; Fish Kettles; Brazing Pans; Tea Boilers; Warming Pans; Preserving Pans; Dripping Pans; Coal Scoops and Coal Hods; Making Coal Scoops; Planishing and Smoothing; Cranes or Syphons; Pumps; Appliances of Railway and Marine Coppersmiths; Making Copper Pipe; Piecing and Joining Pipes; The Fire Pots; Fire Pot Set for Brazing Joint; Soft Soldering Large Joints; Taking Templates; Filling and Bending; Making Bends; Template Boards; Patching Pipes; Outlets; Expansion Joints; Tee Pieces; Three-way Pieces; Cross or Four-way Pieces; Saddle Fire; Marine Work; View of Maudsley, Sons & Field's Shop; Making Large Bends; Making Double Bends; Brazing on Flanges; Short Bends; Air Pipes for Ships; Making Hollow Spheres; Brazing Sheet Brass; Locomotive Brass Work; Brass Dome Covers; Heavy Pipes for Breweries; Brewing Coppers or Kettles; Dome Coppers; Dome and Pan Coppers; Tallow Coppers; Dyers' Coppers; Sugar Tieches; Stills.

—Sent, Postpaid, on Receipt of Price by—

DAVID WILLIAMS, Publisher, 96-102 Reade St., N. Y.

JUST READY.—A Complete Treatise on the ELECTRO-DEPOSITION OF METALS.

Comprising Electro-plating and Galvanoplastic Operations, the Deposition of Metals by the Contact and Immersion Processes, the Coloring of Metals, the Methods of Grinding and Polishing, as well as Descriptions of the Electric Elements, Dynamo-Electric Machines, Thermo-piles, and of the Materials and Processes used in every Department of the Art.

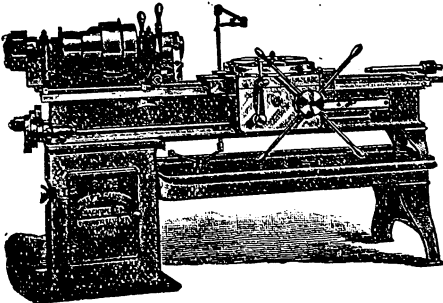
Translated from the German of DR. GEORGE LANGBEIN, with additions by WILLIAM T. BRANNT.

Second Edition, Revised and Enlarged. Illustrated by One Hundred and Thirty-eight Engravings. 458 Pages. Price, \$4.00.

—SENT POST-PAID, ON RECEIPT OF PRICE BY—

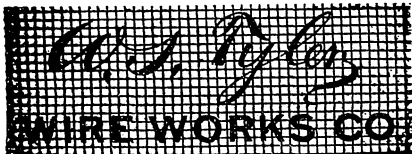
DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.

HAVE YOU A FLAT TURRET LATHE ?



If not send for

RAPID LATHE WORK.
JONES & LAMSON MACHINE CO.,
SPRINGFIELD, VT., U. S. A.



MANUFACTURERS OF

"The Tyler"
Galvanized Poultry Netting.

Alli Widths and Meshes Carried in Stock,

W. S. TYLER, Pres. PROCTOR PATTERSON, Sec. and
Treas.
CLEVELAND, OHIO.

**LABORATORIES OF
DR. GIDEON E. MOORE,**
221 Pearl St., New York.

DEPARTMENT OF CHEMISTRY. Analyses and Assays of Ores, Metals, Waters, Fuel, Oils and Natural and Industrial Products of every description.

DEPARTMENT OF PHYSICAL TESTS. Chas. F. McKenna, Director. Tensile, Transverse and Compression Tests of Iron, Steel and other Metals and Alloys, Cements, Building Stones and Engineering Materials generally. Tests of Lubricating Value of Oils, etc., etc.

PRINTED PRICE-LISTS ON APPLICATION

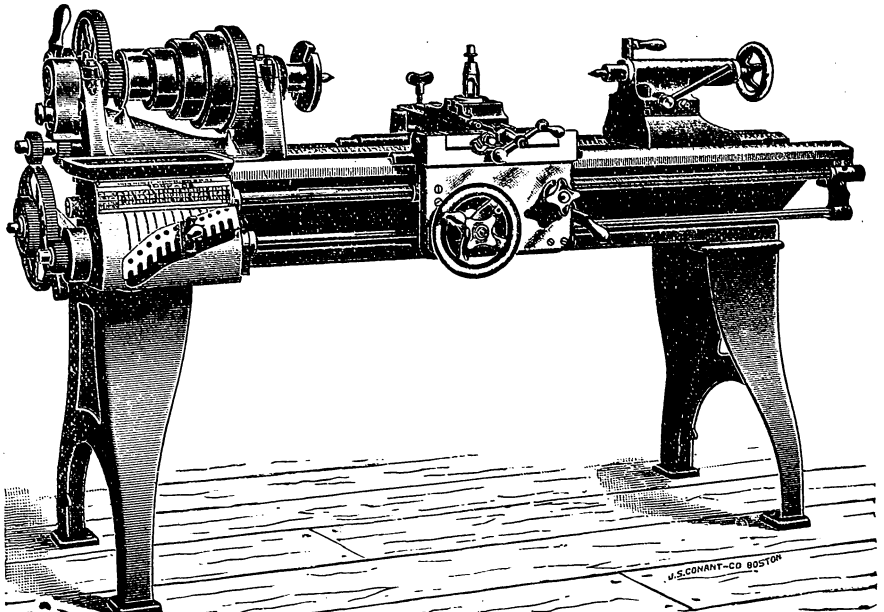
ALUMINUM.

The Pittsburgh Reduction Co.,

116 Water St., Pittsburgh, Pa.,

Offer Aluminum guaranteed equal in purity to the best in the market, at lowest rates obtainable.

**ALUMINUM SHEET, WIRE,
AND CASTINGS.**



The Hendey Machine Co., Torrington, Conn.

A NEW FEATURE IN SCREW CUTTING ENGINE LATHES. THE HENDEY-NORTON LATHE.

This lathe cuts 12 different screws, from 6 to 20, without changing the gears, and feed changes from 36 to 120 cuts per inch without change. This cut shows a 14-inch x 6-foot Lathe. It has hollow spindle, 1-inch. Has compound or elevating rest, as preferred, or the double carriage rise and fall rest. Also taper attachment if desired. The carriage reverses for screw cutting without the use of the countershaft, from the lever at the end of carriage, allowing the spindle to run in one continuous direction. In stock for immediate delivery, 14-inch, 16-inch and 18-inch; 20-inch and 30-inch in the works. Send for descriptive catalogue.

CHAS. CHURCHILL, Ltd., London, England,
SCHUCHARDT & SCHUTTE Berlin, Germany, } AGENTS.
EUGENE SOLLER, Basel, Switzerland.

The Hendey Machine Co., - Torrington, Conn.

DO YOU BORE CYLINDERS ?

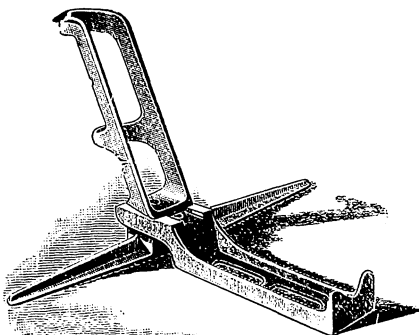
THE HORIZONTAL BORING MACHINE

Is A SPECIAL TOOL FOR THIS PURPOSE.

SEND FOR PARTICULARS TO

**NEWARK MACHINE TOOL WORKS,
NEWARK, N. J.**

J. A. FAY & Co., CHICAGO, WESTERN AGENTS.



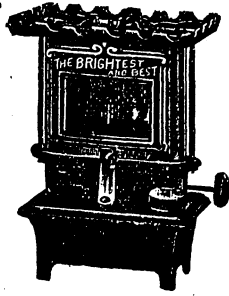
diameters of tires. Price, \$1.00 in colored enamels; \$2.00 nickered.

**IF
YOU
HAVE
A BICYCLE**

You must complete your outfit with a bicycle stand, and E. C. Stearns & Co., Syracuse, N. Y., make the handiest, neatest and best in the market. Fits all

The Stearns Bicycle is the fastest in the world. Fourteen world's records belong to it. Send for a catalogue.

B. & B. Money Makers.



No. 01 B. & B. LAMP STOVE.

List Price, \$8.00 per dozen.
Code word, *Garden*.
Packed one dozen in box.
Weight, 50 lbs.
Height, 8½ inches. Size of Tank, 8½ x 5½ inches.
NICKEL FRONT. Four-inch wick.



No. 03 B. & B. LAMP STOVE.

List Price, \$24.00 per dozen.
Code word, *Gauge*.
Packed ½ dozen in box.
Weight, 65 pounds.
Height, 8½ inches.
Size of Tank, 5½ x 8½ inches.
NICKEL FRONT. Three 4-inch Wicks.

No. 02 B. & B. LAMP STOVE.

List Price, \$18.00 per dozen.
Code word, *Garter*.
Packed one dozen in box.
Weight, 85 pounds.
Height, 8½ inches.
Size of Tank, 5½ x 5½.
NICKEL FRONT. Two 4 inch wicks.



Our discounts will interest you. B. & B. Lamp Stoves, Ovens, Cook Stoves and Oil Heaters are up to the times. Our Prices are made to suit the times. Ask for our 80 page catalogue and be convinced.

The Glazier Stove Co., Mfrs., CHELSEA, MICH.

W. W. MONTAGUE & CO., San Francisco, General Agents for the Pacific Coast.

WHITE MOUNTAIN FREEZERS.

THE
BEST
FREEZER.

Heavy Waterproof Tubs. Cans of Charcoal Tin-plate. Malleable Iron Dashers. All inside parts tin-plated. Gearing completely covered.

Inquire of any leading jobber or write us.

THE
BEST
SELLER.

The White Mountain Freezer Co., Nashua, N. H.



The true test of a Freezer is how well it performs its work; in this respect the unsolicited testimony of thousands pronounce the "Packer Freezers" unexcelled.

**GOOD LUCK, STANDARD,
AND CONFECTIONERS' MACHINE FREEZERS.**

The "Good Luck" is the latest and best low price Freezer on the market. Inside Castings Tinned, Malleable Iron Fittings, Automatic Scraper. White Cedar Pails with Galvanized Steel Hoops. Pine Pails, or Wire Rings with bottom of pail unprotected are not used.

CHAS. W. PACKER, Mfr., 20 N. Fourth St., Philadelphia.

THE WILLIAMS PRINTING CO.,

Commercial Printers AND Binders.

ESTIMATES FURNISHED FOR ALL CLASSES OF WORK.

96, 98, 100 and 102 READE STREET,

NEW YORK.

ICE CREAM FREEZERS with ELECTRIC WELDED WIRE HOOP PAIS.



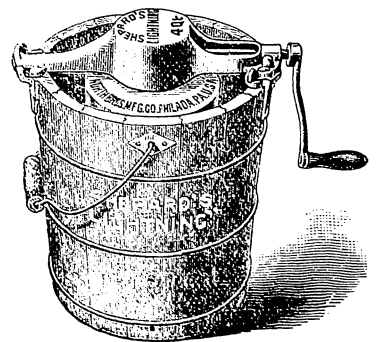
This season we maintain our established reputation as leaders of all improvements in Ice Cream Freezers, and of making the best goods in the market. In adopting, for our entire line, the ELECTRIC WELDED WIRE HOOP PAIS, the hoops of which are twice as strong as the old flat hoops, and are guaranteed not to fall off, we have taken a step in advance of all others. All our pails are made of the Best Virginia White Cedar. All inside parts of Freezers are thoroughly coated with Pure Block Tin. Materials and workmanship are of the very best.

With the acquirement of the Freezer business of the Shepard Hardware Co., we have now the largest, best and most popular line of Freezers in the market. Prices Right.

DISCOUNTS QUOTED ON APPLICATION.

Manufactured by

NORTH BROS. MFG. CO, PHILADELPHIA, PA.



COVERT'S SELF-LOCKING, GATE AND DOOR HOOK.
POSITIVELY PREVENTS BEING UNHOOKED FROM THE OPPOSITE SIDE THROUGH CRACK OR NARROW OPENING
MADE IN TWO SIZES
4 AND 6 INCH XC PLATED.
SAMPLE BY MAIL 15¢

Call for Our Banner Bolt Snap.

This snap has many important advantages over other makes of Bolt Snaps, viz.: It is lighter, the spring is entirely covered and protected from foreign substances and freezing, and is lower in price.

Made in all sizes; Round, Loop and Open Eye. We are headquarters and the most extensive manufacturers in Saddlery, Coach and General Hardware Specialties.

Covert's Saddlery Works,

FARMER, N. Y., U. S. A.

**Hardware Dealers
Can Profitably
SELL BICYCLES.**

There is a large trade in Bicycles in all parts of the country and much of that trade naturally belongs to dealers in hardware. Good bicycles meet with a ready sale and pay a fair percentage of profit.

COLUMBIAS

Are the representative high grade machines in America. A Columbia is the easiest machine to sell to the best trade because it is unquestionably the standard wheel of the world.

We want enterprising agents of good standing and solicit correspondence.

Pope Mfg. Co.,

221 Columbus Ave.,

Boston, Mass.

INSTRUCTION BY MAIL

In Architecture, Architectural Drawing, Plumbing, Heating and Ventilation, Bridge Engineering, Railroad Engineering, Surveying and Mapping, Electrical Engineering, Mechanical Drawing, Mining, English Branches, and

MECHANICS.

Diplomas awarded. To begin students need only know how to read and write. Send for FREE Circular of Information stating the subject you think of studying to THE CORRESPONDENCE SCHOOL OF MECHANICS AND INDUSTRIAL SCIENCES, Scranton, Pa.

4000 STUDENTS.

CLARK'S BEST QUALITY SCREW DRIVERS.



Four Drivers and one Handle; all interchangeable; are hardened and tempered all over; made of best stock, and finished first-class.

FOR SALE BY ALL HARDWARE DEALERS.

MANUFACTURED BY

R. H. BROWN & CO.
NEW HAVEN, CONN.

*You take no risk on the quality
We make only the best!*



**Sand
Papers**

IN
Reams and Rolls

Flint Paper
Garnet Paper
Emery Paper
Emery Cloth

HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

BAEDER, ADAMSON & Co.

730 MARKET STREET, PHILADELPHIA.
67 BECKMAN STREET, NEW YORK.
143 MILK STREET, BOSTON.
182 LAKE STREET, CHICAGO.

THE GEM SOLID STEEL MINCER



Single
and

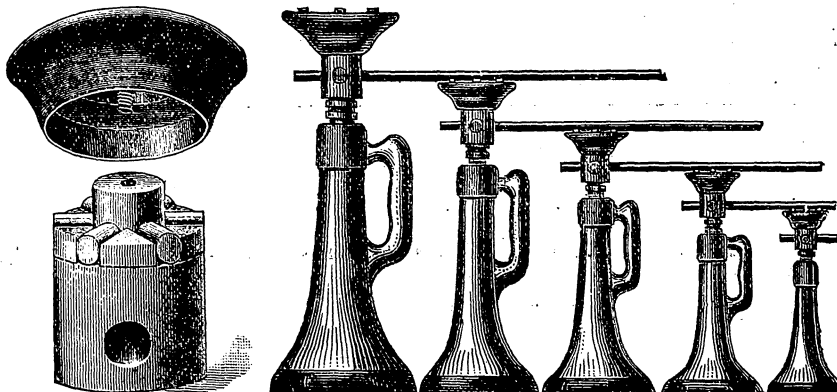
Double Blades

Handle and Blade Formed in one piece.
Always Clean. Indestructible.
No Rivets to Wear Loose.
No Wooden Handle to Shrink, Swell, Loosen Split, or Fill with Rancid Grease.

MANUFACTURED BY

PALMER HARDWARE MFG. CO.
TROY, N. Y.

ROLLER JACK SCREW.

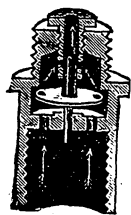


We have experimented much with ball bearing Jacks, and found them very satisfactory when not heavily loaded. Now, instead of balls we put in rollers, as seen in cut. These rollers will stand any load that the Jack will carry, and are not liable to get out of order. We have thoroughly tested these Roller Jacks with a spring balance and find a saving of forty per cent. of power needed to lift a given weight.

The price is about ten per cent. more for Roller Jacks, and the gain is 40 per cent. This ought to insure their sale as fast as the facts become known.

MILLERS FALLS CO.,

93 READE STREET, - - - NEW YORK.

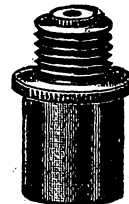


Actual Size.

"Economist" Gas Governor

GAS BILLS REDUCED 25 PER CENT.

Retails for 30 cents and gives large profit to agent. We place our governors on trial for 30 days and guarantee perfect satisfaction. Agents wanted in all cities and towns where gas is used. Write for circular and agents' price to



The New York Gas Saving Co.,

Decker Building, Union Square, N. Y.

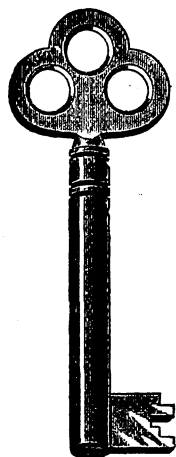
Closing Out Leading Lines of Tools.

Starrett's, Stevens', Brown & Sharpe's, Chesterman's, Stub's, Grobet and other makes of Tools and Files, Moulders' Tools, Chucks, Drills and Reamers, Steel Rules, Squares, Calipers and Dividers, Brass Gears and Pinions. Call early while assortment is unbroken.

THE FRASSE COMPANY, 19 Warren St., N. Y.
P. O. BOX 879.

CABINET LOCKS

OF EVERY KIND.



DRAWER LOCKS,
CUPBOARD LOCKS,
WARDROBE LOCKS,
CHEST LOCKS,
DESK LOCKS.

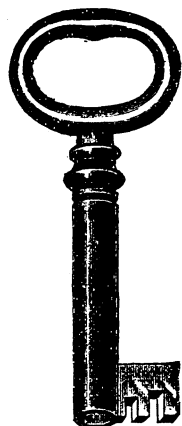
A complete line of more than 1000 list numbers exclusive of our old
and complete line of

YALE CABINET LOCKS.

THE YALE & TOWNE M'F'G CO.,

STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburg. San Francisco.



THE DEALER who sells what
THE PEOPLE ask for.

MAKES FRIENDS and MONEY, and
SAVES TIME and TROUBLE.

The people ask for

LePage's Liquid Glue,

And the people are right.

It is the strongest and best glue made. It has been
imitated, but never equalled. Be sure to get what you
order and ACCEPT NO SUBSTITUTES.

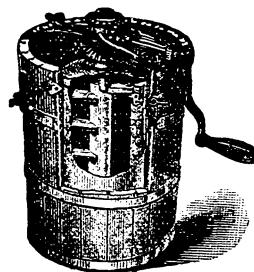
Our name is on every label

RUSSIA CEMENT CO.,

GLOUCESTER, MASS.

New York Office, 95 Reade and 113 Chambers Streets.

Pacific Coast Office, 23 Davis Street, San Francisco, Cal.



"RAPID."

"Home" Freezers,
2 to 10 quarts.

"Rapid" Freezers,
2 to 40 quarts.

"Rapid"
Ice-Breakers,
4 sizes.

Sundry Ice-Cream
Apparatus.

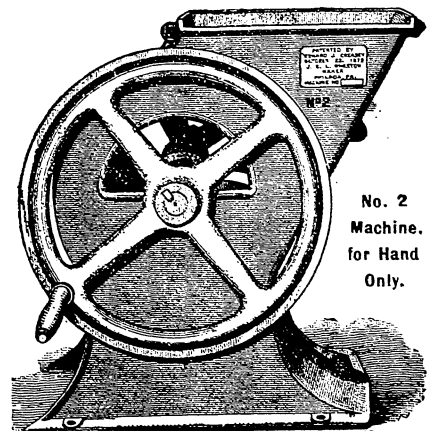
Send for Descriptive Catalogue and Attractive
Quotations.

CLEMENT & DUNBAR,
No. 1129 Beach St., PHILADELPHIA.

CREASEY ICE BREAKERS.

Hand or Power. Seven Sizes.

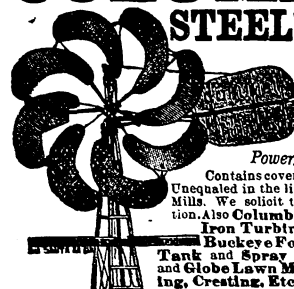
Used and recommended by all consumers of broken
ice, ice cream manufacturers, hotels, restaurants,
dairies, caterers, fish and meat packers, ice dealers, &c.



No. 2
Machine.
for Hand
Only.

Jso. S. Lovering Wharton, Germantown Junction,
PHILADELPHIA, PA.

COLUMBIA STEELWIND MILL

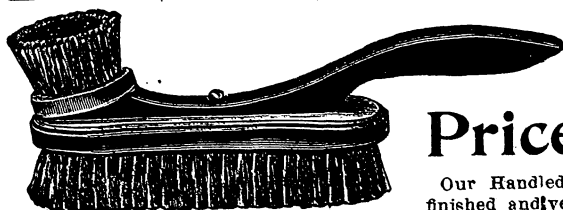


New in Principle.
Beautiful in
Appearance.

Powerful in Operation.

Contains covered Internal Gear.
Unequaled in the line of Pumping Wind
Mills. We solicit the closest investiga-
tion. Also Columbia Steel Derricks,
Iron Turbine Wind Engines,
Buckeye Force & Lift Pumps,
Tank and Spray Pumps, Buckeye
and Globe Lawn Mowers, Iron Fenc-
ing, Cresting, Etc. Write for circular.

MAST, FOOS & CO., SPRINGFIELD, O.



Brushes And

Prices to suit the trade.

Our Handled Shoe Brushes are handsomely
finished and very salable. No nails. Handles and
Top Knots are screwed on.

THE BROMWELL BRUSH & WIRE GOODS CO.,

CINCINNATI, O.

H

W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 209.

Fig. 381.

Fig. 145.

or wherever it is desired to raise a large quantity of water by
hand power.

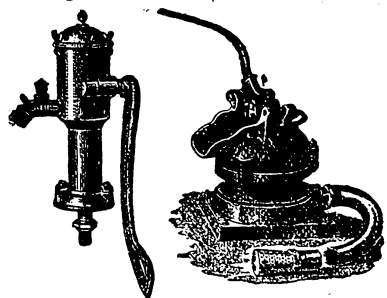
The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

CAPACITY

from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.
Made either as shown in out for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.



C. I. Grindstone Frame.

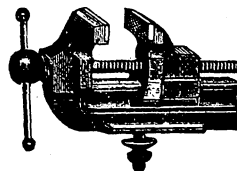
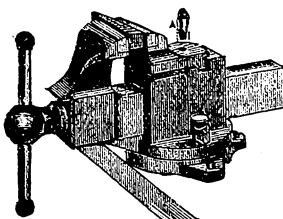
THE DEMING
FACTORY
SALEM O.U.S.A.
MANUFACTURERS OF
HAND & POWER
PUMPS,
WELL
SUPPLIES
& C. VERTICAL STEAM PUMPING
ENGINES.
N.Y. OFFICE
72 JOHN ST.
HENION & HUBBELL
GEN'L. WESTERN AGTS.
55 & 57 N. CLINTON ST.
CHICAGO, ILL.

PRENTISS' PAT. VISES.

The Leaders for 20 Years.

Send for Illustrated Catalogue
of

ALL KINDS OF VISES.
PRENTISS VISE COMPANY,
MANUFACTURERS,
44 Barclay St., New York.

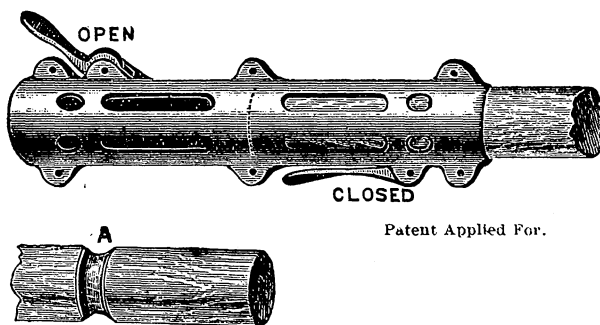


F.E. MYERS & BRO.

ASHLAND O.
LIFT PUMPS
THE LARGEST PUMP WORKS
EXCLUSIVELY
UNITED STATES
+ CATALOGUES FREE +
Ashland Pump and Hay Tool Works.

The New York Safety Dumb Waiter.
The Manhattan Dumb Waiter.
The Improved Humphrey Hand Elevator.
Made specially to be sold by Hardware Stores.
Thousands in use. Catalogues on application.
THE STORM MANUFACTURING CO.
NEWARK, NEW JERSEY.
Formerly of Poughkeepsie, New York.

J.F. WOLLENSAK
CHICAGO, ILL.
THEATRICAL
HARDWARE.
FOR ILLUSTRATED
SEND PRICE LIST



For prices and discounts
address

THE BOURKE MANUFACTURING CO., Youngstown, O.

Extension

Handle Coupling.

Made entirely of
Malleable Iron and
cannot break.

Handles lock in
coupling by means of
a cam lever and can-
not pull out.

Hudson's Garden Hose Mender.

So Simple a Child Can Use it.

Made in three sizes, for 1/2 in., 3/4 in. and 1 in. hose.

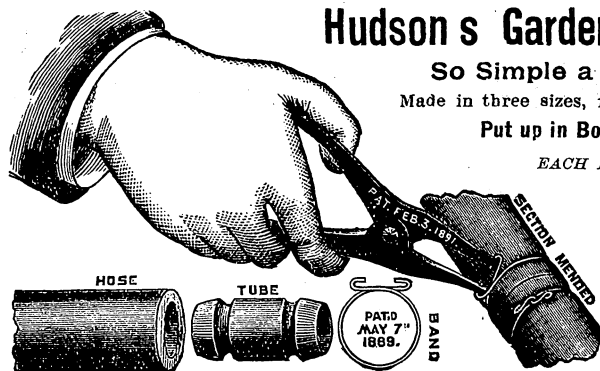
Put up in Boxes for Family use.

EACH BOX CONTAINS:

1 Pair Pliers,
20 Bands,
6 Tubes.

Sells readily at 75 cents.
Liberal discount to Dealers.

Send for Full Description.



C. E. HUDSON & CO., Manufacturers, Leominster, Mass.

GEO. N. CLEMSON, Pres.

S. S. BATTIN, Vice-Pres.

ROBERT J. JOHNSON, Treas.

F. B. EARLE, Sec.

THE NATIONAL SAW CO.,

OPERATING

Wheeler, Madden & Clemson Mfg Co., Wood-rough & McParlin, Richardson Brothers, Harvey W. Peace Co., Monhagen Steel Works, Wood-rough & Clemson, Pennsylvania Saw Co.

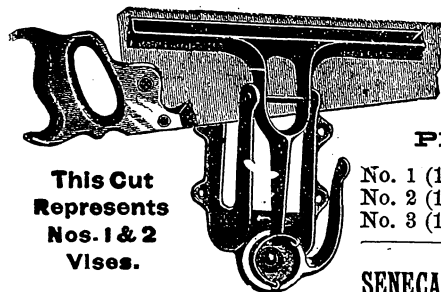
SEND FOR PRICE-LIST.

GENERAL OFFICE:

NEWARK, - - New Jersey,

SAWS

WENTWORTH'S PATENT NOISELESS SAW VISES, WITH RUBBER CUSHIONED JAWS.



This Cut
Represents
Nos. 1 & 2
Vises.

Prevent all vibration and render Saw Filing noiseless.
Will make no more noise than Filing on a Solid Piece of Iron.

Have a Larger Sale than All Other Kinds Combined.

PRICE LIST.

	PER DOZ.
No. 1 (11 inch Jaws),	\$15.00
No. 2 (15 inch Jaws),	21.00
No. 3 (11 inch Jaws),	18.00

LIBERAL DISCOUNT TO THE TRADE.

LONGEST JAWS, HEAVIEST AND
BEST FINISHED.
Sold by all leading jobbers of gen-
eral Hardware at Factory Prices.

—MANUFACTURED BY—

SENECA FALLS MFG. CO., 255 Water St., Seneca Falls, N. Y.



No. 3 Vise.

CARR'S Improved Surface Gauge. Best selling tool in the market. Agents wanted.
The Hoggson & Pettis Mfg. Co.,
NEW HAVEN, CT.,
Mfrs. of the Celebrated Sweetland Chuck.

WM. KROGSRUUD,
Engraver and Die Sinker,
61 Fulton St., N. Y.
Manufacturer of
STEEL STAMPS
For Every Purpose.
Steel Letters and Figures.
Burning Brands, Stencils,
&c. Send for Illustrated
Catalogue.

3 NICKLE, Silver and Bronze Metallic
Figures and Letters, Sizes 1/4 in to 3 in.
Pattern Letters, Steel Stamps, Brands,
Dies &c. Send for Reduced Price List.
We make a specialty of the Hardware Trade.
A. A. WHITE & CO., Providence, R.I.

JESSE JONES & CO.,
HARDWARE
SHELF BOXES
Made of Wood.
No screws or
nails used to work
out and cut
your shelving.
815 & 617 Commerce St., Phila.
Send for circular and list of references.

CARPENTERS' & MACHINISTS'

IRON BENCH LEVEL

WITH DOUBLE PLUMB.

No. 5. 6 in.



MANUFACTURED BY

C. F. RICHARDSON & SON,
ATHOL, MASS.

· WITHOUT A PEER ·
CRESCENT GROUND
· THE SIMONDS ·
CRESCENT GROUND
· CROSS CUT SAW ·
Simonds Mfg Co. Simonds Saw Co.
FITCHBURG, MASS. CHICAGO, ILL. SAN FRANCISCO CAL. PORTLAND, ORE.

The Taintor Positive Saw Set.

Mechanics are now inquiring for this tool, and Hardware Dealers
should have them in stock, or at least have a sample.

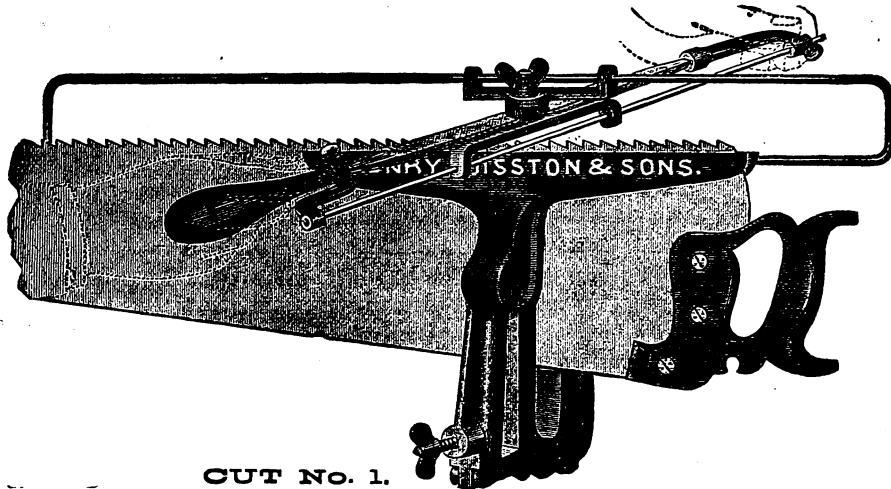
For Prices and Discounts, address

WIEBUSCH & HILGER, LTD., SOLE AGENTS,
84 and 86 Chambers Street, NEW YORK.

J.F. Wollensak
CHICAGO, ILL.
ELECTRICAL SUPPLIES
SEND FOR ILLUSTRATED PRICE LIST
KEYS OF ALL KINDS
J.F. WOLLERSAK
CHICAGO, ILL.

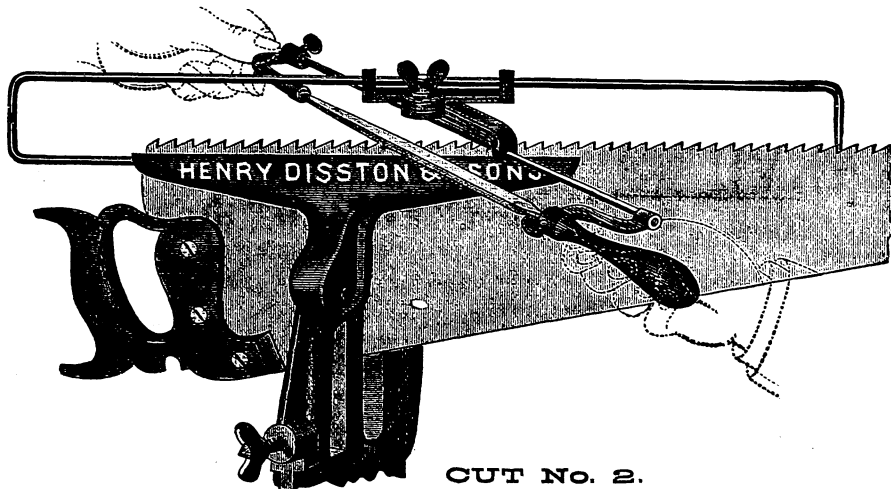
DISSTON'S Improved Saw Clamp AND FILING GUIDE.

ESPECIALLY DESIGNED TO ASSIST THOSE NOT SKILLED IN THE ART
OF SAW FILING TO FILE A SAW CORRECTLY.



CUT No. 1.

Cut No. 1 shows a saw and the attachment in proper position for filing the first side; and Cut No. 2 shows the saw and attachment reversed and in position to file the second side. There are three marks on one of the hubs of the swivel attachment, and one mark on the other. One of the three marks shows when it is in position No. 1, and the other designates when it is in position as shown in No. 2. The third, or centre, marks show when it is in position for filing Rip Saws.



CUT No. 2.

To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.

A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.

This filing guide is sold only attached to our No. 3 Improved Clamp or Vise, and not sold separately. We recommend this as the best saw clamp on the market, being quickly and easily adjusted, and not liable to get out of order.

Write for price including No. 3 Clamp, Filing Guide, File and Handle complete: Packed one in a wooden box.

Henry Disston & Sons, Philadelphia, Penn. INCORPORATED,

Samuel W. Allerton, Pres.

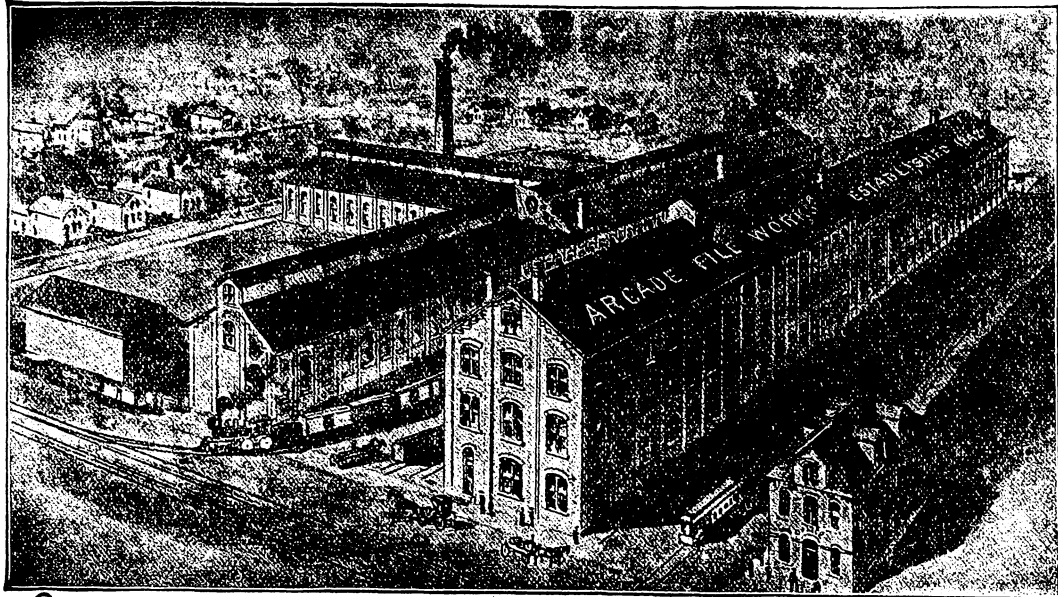
Courtlandt C. Clarke, Sec. and Treas.

Alfred Weed, Vice-Pres. & Gen. Manager

ARCADE FILE WORKS.

ESTABLISHED 1842.

Eastern Office and Warehouse,
83 R ADE STREET, NEW YORK CITY.



Western Office and Warehouse,
23 LAKE STREET, CHICAGO, ILL.

Works: ANDERSON, IND.

THE FILES THAT LEAD THEM ALL.

THE BEST EQUIPPED FILE WORKS IN THE WORLD.

The fact that we alone use the improved File Machinery recently invented by Alfred Weed, and the even heat of natural gas, enables us to produce a file that will cut faster and wear longer than any on the market.

Warranted Better than the Best

ENGLISH ANVIL

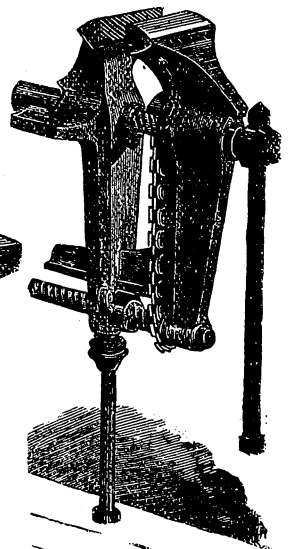
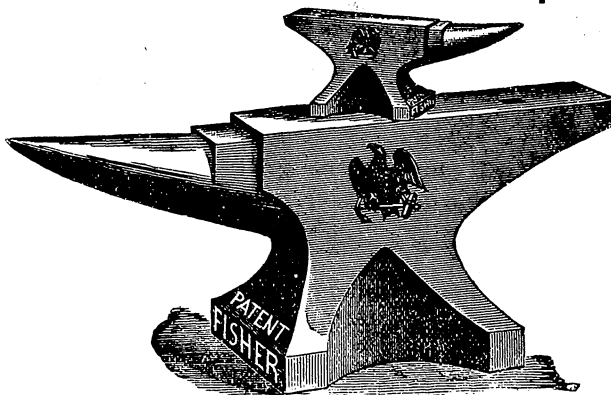
Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough untempered steel, never to break or bend. Only Anvil made in the United States fully warranted as above.

FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

ESTABLISHED 1843.
MORE THAN 200 DIFFERENT PATTERNS.

None Genuine without our Trade-Mark.

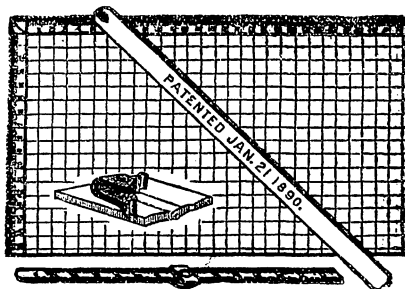
EAGLE and "FISHER" Stamp.**EAGLE ANVIL WORKS,****Trenton, N. J.**

Sold in New York by our Agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfr. Co., 45 Chambers St.

JOHN LOYD,

Machine Knives, Shear Blades,
Presses and Dies.

Nos. 558 to 562 Water Street, New York

**The Canton Glass Board.**

Cuts any Fraction of an inch by Eighths.

Unequaled for accuracy and quick work in cutting square or at any angle. Saves breakages, &c.

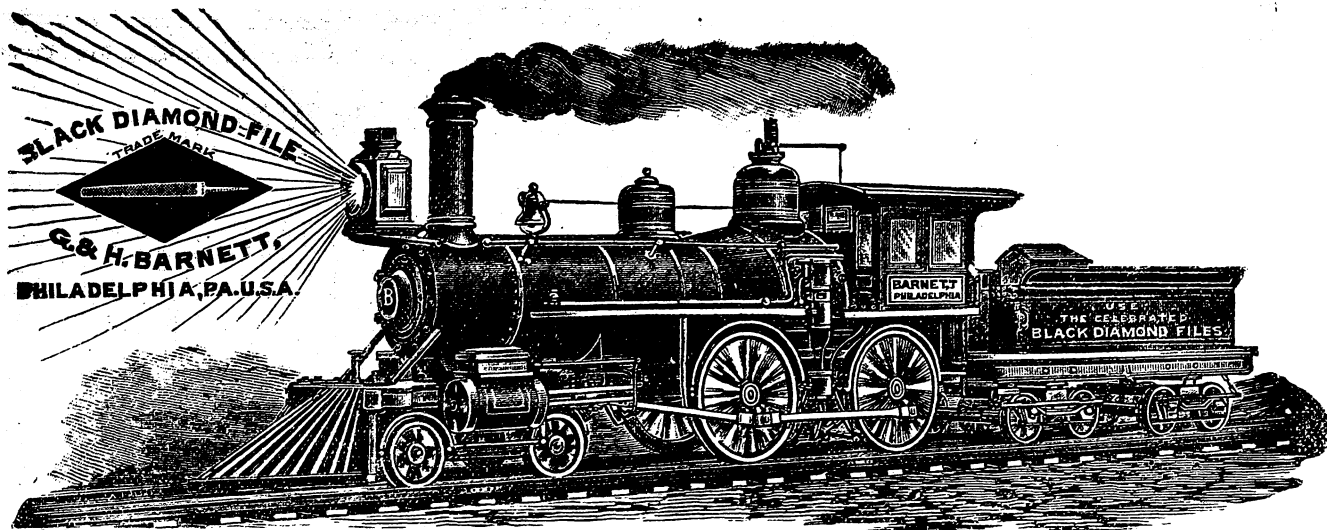
—ALSO—

IMPROVED TRAMMEL RULE for Cutting Circles
From 3 inches up to 48 inches, Segments,
Gothic Shapes, &c.

Send for Circular.

The Canton Saw Co., Canton, Ohio.

Hosted by Google



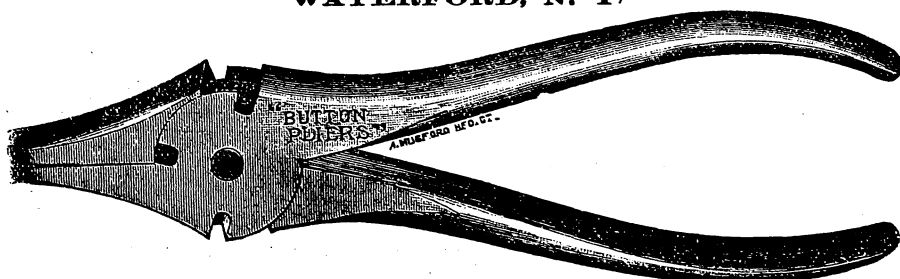
THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

NICHOLSON FILE CO.
PROVIDENCE, R. I.

3000
VARIETIES FILES
[X.F.] AND INCREMENT CUT FILES

J. M. KING & CO.,
WATERFORD, N. Y.

Manufacturers of
BUTTON'S



**Pat. Wire Cutter
AND PLIER COMBINED.**

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SCREW TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

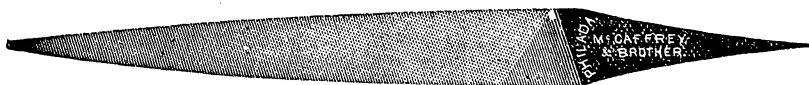
Established by DANIEL B. KING, 1829.

Philadelphia, 1876.



McCaffrey File Co.,
FIFTH and BERKS STS.,
PHILADELPHIA, PA.

For Superiority.



Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

BEST
CRUCIBLE
STEEL.

"TROJAN" HORSE RASPS AND FILES.

LOWEST
IN
PRICE.

STRONGEST
TOOTH.

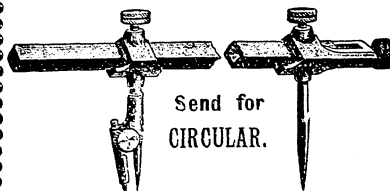
BANKER & WHITE,

TROY, N. Y.

(Troy File Works.)

N. Y. Agent GEO. M. MATTESON 111 Duane St.

TRAMMEL FOR Pattern Makers, Draughtsmen.



Send for
CIRCULAR.

Hurley Bros., Manufacturers of
FINE TOOLS,
HARTFORD, CONN.

Flint Sharp, Clean,
Carefully Graded.
Low Prices.

CRYSTAL MILLS CO. - Chester, Mass.



John Wilson's Butchers' Knives and Steels, Skinning, Sticking, Farriers' & Shoe Knives,

Have established and maintained their reputation, for superiority,
against all Competitors, from

THE YEAR SEVENTEEN HUNDRED & FIFTY,
and are still in increasing demand. As in the past, it is the unalterable
DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF THE HIGHEST POSSIBLE QUALITY.

WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND.

SOLE AGENTS FOR THE UNITED STATES, AND THE CANADAS.

Messrs. Hermann Boker & Co., 101 and 103 Duane St., New York.

1853

1894

Highest Awards at the World's Exposition for Superior Tools.

GREETING

TO THE HARDWARE TRADE:

At the age of 20 I left my native place, Sheffield, England in response to a call from the late D. R. Barton, of Rochester, N. Y., who was then trying to meet the demand for a class of Edge Tools that would be equal to the English Tools. I took charge of the Finishing Department, and was in his employ about four years, when I came to the conclusion that I could manufacture CHISELS and GOUGES equal to any imported, hence the origin of Buck Tools. I began in company with my brothers, John Buck and R. T. Buck (both now deceased). We commenced with the Tools stamped Chas. Buck & Co., under which name we formed the foundation of the name and stamp of Buck Brothers. For 20 years I did a greater part of the *forging and tempering*, which established Buck Tools with the reputation of being the best Tools in the market. In 1872 I retired from said firm. In 1873 I again commenced to manufacture Buck Tools and stamp them CHARLES BUCK, and again I have established a reputation of making the best Tools in the market, and I would caution all, if they want the best, to see that they get those stamped CHARLES B. CK. Yours very respectfully,

CHARLES BUCK.



CHARLES BUCK.
The only Surviving Member of the
Original firm of Buck Bros. Estab. 1853.

MILLBURY EDGE TOOL WORKS,

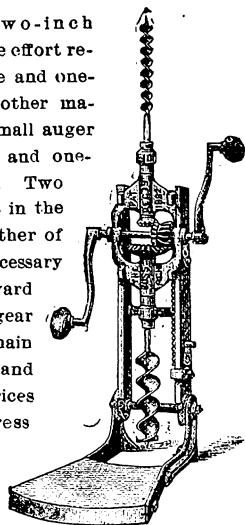
MILLBURY, MASS.

The Boss 2-speed Boring Machine,

Will operate a two-inch auger with the same effort required in using one and one-half inch in any other machine, and for the small auger have a speed two and one-half times faster. Two augers may be kept in the machine, to use either of which it is only necessary to point it downward by first taking the gear frame out of main frame, inverting and replacing it. For prices and discounts address

Buckeye Mfg. Co.

Union City, Ind.

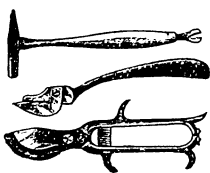


— REMEMBER —

WE MAKE ONLY

The Very Highest Grade
OF
MECHANICS' TOOLS.

H. H. WAYHEW CO., Shelburne Falls, Mass.



THE
KNAPP & COWLES
MFG. CO.,
Bridgeport, Conn.,
Makers of a large line of
STANDARD
Hardware Specialties.
SEND FOR
K Catalogue.

Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL
MADE, FROM GOOD MATERIALS BY

A. J. Phillips & Co., Fenton, Mich.



THE TRADE acknowledges our BUTCHERS' STEELS
make of
THE BEST IN THE WORLD.

FOR CATALOGUES AND PRICE-LISTS ADDRESS

C. & A. HOFFMAN, Manufacturers. FRANKFORD, PHILA., PA.

ESTABLISHED 1816.

WHITE, VAN CLAHN & CO.,

15, 16 and 17 CHATHAM SQUARE N. Y.

Dealers in GENERAL HARDWARE.

SOLE AGENTS IN THE U. S. FOR THE CELEBRATED

J. B. Addis & Sons' Wood Carvers' Tools.

EMPIRE WINDOW SCREENS AND DOORS WITH PATENT FLY ESCAPE.

"Van Glahn" and "Gem" Lawn Mowers, Barb Wire, Green Wire Cloth, Poultry
Netting, Farming Tools, Etc.

WRITE FOR PRICES.

SHARP TOOLS are a NECESSITY to a good workman,

But without a GOOD WHETSTONE they are an impossibility.

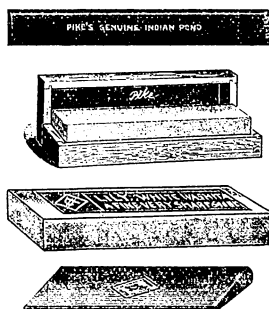
That is why it is always economy to buy

PIKE'S WHETSTONES.

Pike's Indian Pond Scythe Stone, Strong, Sharp
Grit, Quick Cutting.

Scythe Stones.

Oil and Water Stones.



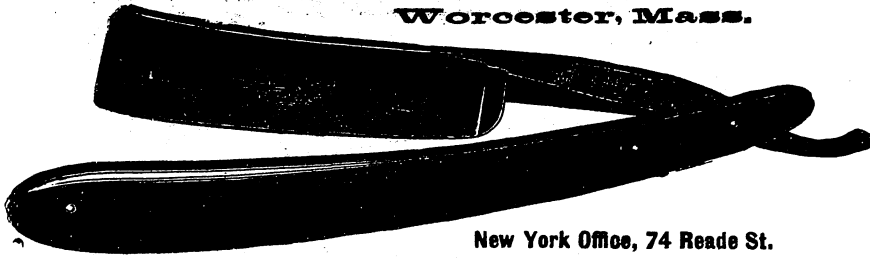
GREEN MOUNTAIN,
LAMOILLE,
BLACK DIAMOND,
PREM. QUINNEBAUG,
WHITE MOUNTAIN,
GENUINE RAGG,
WILLOUGHBY LAKE.

WASHITA,
ARKANSAS,
HINDOSTAN,
WATER OF AYR,
RAZOR HONES,
TABLE HONES,
AXF STONES, ETC.

THE PIKE MFG. CO., - Pike Station, N. H.

J. R. TORREY RAZOR CO.,

Worcester, Mass.



New York Office, 74 Reade St.

Our Razors have become the standard for excellence and are no higher in price than the foreign. We manufacture and carry in stock more than 200 styles. Send for illustrated catalogue.

"Stamped with the BUCK'S HEAD."



BUCK BROTHERS, MILLBURY, MASS.

The Most Complete Assortment in the U. S. of
Shank, Socket Firmer and Socket Framing
Chisels, Fine Bevel Edge Chisels, Plane Irons.

TWO PRIZE MEDALS,

No. 1098 and No. 1099, AT WORLD'S FAIR.

Buyers are cautioned against any parties who claim a recent connection (or any connection for over 20 years) with Buck Bros., or who represent goods as our make not stamped with the BUCK'S HEAD or BUCK BROTHERS in full.

1825
R. HEINISCH.

1871
R. HEINISCH'S SONS.

1892
R. HEINISCH'S SONS CO.

CAUTION. TO ALL PURCHASERS OF THE WELL KNOWN HEINISCH BRAND OF

Shears, Trimmers, Scissors, Tinnern's Snips, &c.

All Goods of our Manufacture are Stamped

R. HEINISCH
NEWARK, N.J.

OR

R. HEINISCH
NEWARK, N.J.
U. S. A.

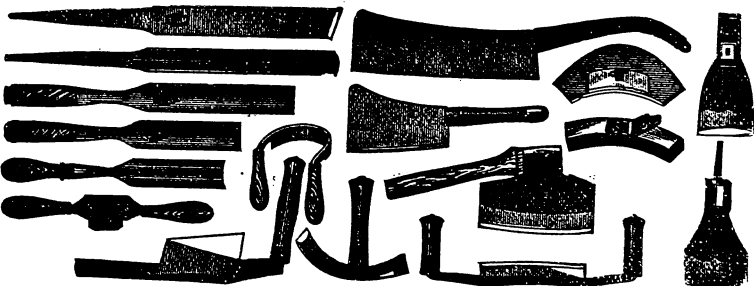
NO OTHERS ARE GENUINE.

NEW YORK OFFICE AND SALESROOM,
90 CHAMBERS ST.

R. HEINISCH'S SONS CO.,
NEWARK, N. J., U. S. A.

HIGHEST AWARD PARIS EXPOSITION, 1889.

ESTABLISHED 1837.
INCORPORATED 1892.



THE L. & I. J. WHITE CO.,
BUFFALO, N. Y.

MANUFACTURERS
OF
EDGE TOOLS.
Coopers', Carpenters' and Ship Tools, Plane Irons,
Cleavers, &c. Full Line Chisels.

SICKELS, SWEET & LYON,

Wholesale Hardware.

Office, 35 Barclay St. Warehouse, 40 Park Place, New York.

Carry Stock of Jackson, Mich., Farming Tools

Shipments from Factory if preferred.

N. Y. AGENTS FOR

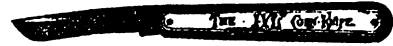
Cortland Door and Window Screen Co., Union Steel Screw Co., Eagle
File Co., Perfection and New Easy Lawn Mowers.
Spring Catalogue No. 7 issued in February.

Cast Shears.

ACME SHEAR CO.,

BRIDGEPORT, - CONN.

WHEN IN WANT OF WOSTENHOLM'S I★XL



Knives or Razors,

SEND TO

FRED. B. GURNEY,

116 Chambers St., N. Y.

IF YOU WANT THE BEST
BRITANNIA SPOONS
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL TO ANY OTHER
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
NICKEL SILVER SPOONS
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL TO ANY OTHER
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
SILVER PLATED SPOONS
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL TO ANY OTHER
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

CUTLERY

Will mark price &c.,
on cutlery.

ENAMEL

Guaranteed not
to rust.

Flows from Pen as readily as ink.
FREE BY MAIL, 50 CENTS.

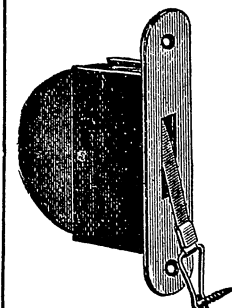
A. B. SHIPLEY & SON, 503 Commerce St.,
Philadelphia, Pa.

8 Years' Experimenting

Gives us many advantages over all others in
producing the only

Steel Frame Sash Balance

Made in the U. S. It is the most durable device
ever invented for counterbalancing the weight
of sash.



NO POCKETS OR
BOXES REQUIRED.

Can be used in
old as well as new
houses. Warranted
15 years.

Write for Illustrated
Price-List.

PULLMAN SASH BALANCE CO., Rochester, N. Y.

New York Office, 142 Chambers St.
Chicago Office, 235 Lake St.



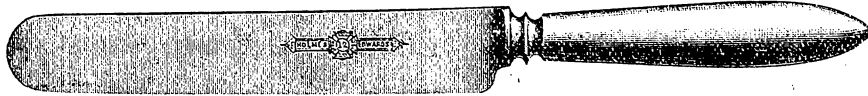
We have a full line of above, which is the neatest pattern ever presented to the trade, and it is stamped



NONE GENUINE WITHOUT THIS TRADE-MARK.

WM. ROGERS MFG. CO., Offices, Hartford, Conn.
 FACTORIES HARTFORD, CONN., NORWICH, CONN., AND TAUNTON, MASS.

SILVER PLATED KNIVES AT REDUCED PRICES.



WINDSOR. PLAIN HANDLE.



WINDSOR. ARAB HANDLE.

Combination Sets, 6 Knives and 6 Forks, in Satin Lined Case, at same price as Knives.

—SEND FOR PRICES.—

THESE PATTERNS AT SPECIAL FIGURES.

An opportunity for the Hardware Dealer. Offer not repeated this season.

Full 12 dwt. Stamped our name and trade-mark.

THE HOLMES & EDWARDS SILVER CO., - **BRIDGEPORT, CONN.**

NORTHAMPTON CUTLERY COMPANY, NORTHAMPTON, MASS.

NEW YORK

SALESROOM,

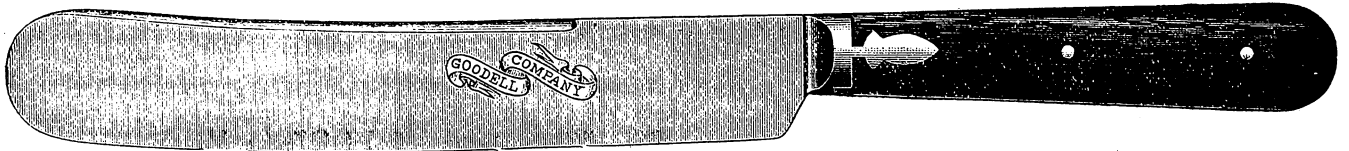


122 Chambers Street.

TABLE CUTLERY, BUTCHERS' CARVERS, PLATED GOODS, &c.

Send for Revised Catalogue.

GOODELL COMPANY,
ANTRIM, N. H.



— : MANUFACTURERS OF : —

Table Cutlery, Butcher Knives, Carvers, Shoe Knives, Butcher Steels, &c., &c.

The quality and finish of our goods is unsurpassed. Our prices are suited to the times. Our new catalogue will be ready for distribution April 1st. Send for one if desired.

AGENTS

THE ALFORD & BERKELE CO., 77 Chambers St., N. Y. City.

HENRY KEIDEL & CO., Baltimore, Md.

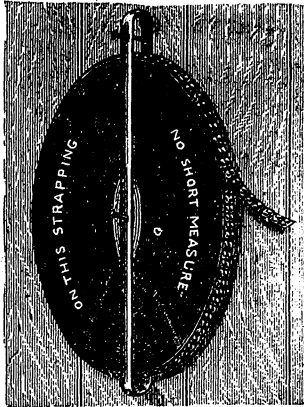
A practical means of rapidly reaching absolutely accurate results without the mental wear of computing.

It gives at a glance the net of any sum at a great range of discounts, simple and complex, and it is accurate, rapid and practical. Price, \$3.00; Double Indexed Edition, \$4.00.

Mailed, postpaid, upon receipt of price by **DAVID WILLIAMS,** 96-102 Reade Street, New York.

LADD'S DISCOUNT BOOK.

PATENTED IN ALL COUNTRIES.



Showing Reel hung up ready for use.
SIX PATENTS.
 Dated: May 1st, 1889; Nov. 25th, 1890.

INJUNCTION NOTICE.**THE U. S. COURT SAYS IN ITS DECISION:**

The defendant admits making and selling Box Straps which clearly contain CARY'S PATENTED INVENTION, although the "Bosses" are shaped differently than those shown in the drawings. "Injunction granted."

All Goods put up in this style to be genuine must bear the name of the **CARY MANUFACTURING CO.**, stamped on each reel.

CARY MANUFACTURING CO., 5 to 9 Elm St., NEW YORK.

Two Heads Better Than One?**Finest and Strongest Steel Jaw.**

(Drop Forged and Interchangeable.)

Hard Tempered by New Process.

Does Not Batter.

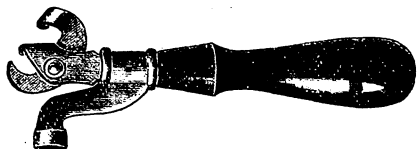
LIGHT,

STRONG,

DURABLE.

Certainly—**BARREL HEADS.** Save heads and hoops intact, and the **EMPTY** barrel is more useful, and can be sold for an increased price. That's plain, is it not? The "**BOSS**" **BARREL OPENER** is the first tool invented to easily and quickly pull nails out of barrel heads and hoops—quicker than a nail puller does out of boxes. Adapts itself to shape and "give" of a barrel. It fills the want of

Grocers, Bakers, Commission Merchants, and other dealers for just such a tool, and will be a "**QUICK SELLER.**"

\$1.75, RETAIL PRICE**"The Columbia."****Specialty****Manufacturing Co.,**

Latest and Best.

Fine Steel, Warranted.

HARTFORD, CONN.,

MANUFACTURE

*Columbia Nail Pullers,**Black Hawk Nail Pullers,**Hartford Nail Pullers,**"Boss" Barrel Openers.***THE INCOME TAX**

has no such terror for the house-keeper as the outcome of tacks from a carpet.

JOB'S PATIENCE

is needed when taking up carpets the old fashioned way.

BUY**The Columbia Tack Puller.****TRADE PRICES:**

	PER DOZ.
Columbia Tack Puller,	\$1.50
Columbia Tack Puller and Hammer Combined,	2.00

Cash with Order. We Pay Express.

SEND FOR PRICE-LIST.**IT SELLS QUICK.**

This is a fac-simile of the label on my **VULCAN TOOL CO.** brand of **HATCHETS**; a brand for which I have a regular trade in some sections, but to those who have not "caught on"—dealers who are handling an outside brand—I offer a limited quantity at a very low price. Inquiries for price solicited.

FAYETTE R. PLUMB, Philadelphia.

PATENT IMPROVED**HENRY COMBINATION HAFT,**

Containing five Brad-Awls, one Chisel, Screw Driver, Diamond Point Awl, Marking Awl, Counter Sink, Tack Puller and Reamer. Send for Circular of full description and illustration. If you would have the Best, get the Patent Improved. Sent post-paid on receipt of \$1.00.

HORACE E. BRITTON, Patentee and Sole Manufacturer, STOUGHTON, MASS.

AMERICAN TOOL COMPANY, NEW YORK, MANUFACTURERS OF

TOOL CHESTS

Of all sizes, complete with tools, for Hardware, Toy, Notion and Variety trades.

Factory and Salesroom,
200 West Houston Street, near V
 Also Machinists' Tool Chests, empty. Illustrated Catalogue and prices furnished on application.



DO YOU AIM

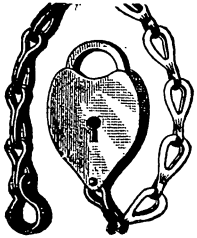
To Make a Bull's Eye

In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a HIT by sending for the IDEAL HAND BOOK.

IDEAL MFG. CO., New Haven, Ct., U. S. A.

Please mention *The Iron Age* when you write.

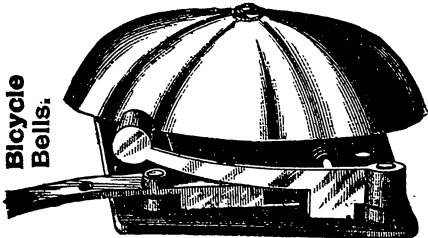


Bicycle Locks. Bicycle Bells.

Especially Low Prices.

We manufacture hardware specialties of all descriptions to order.

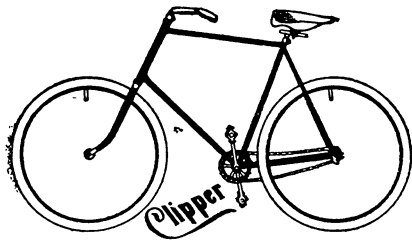
HAINES & ZIMMERMANN, 407 Cherry St., Phila



Bicycle Bells.

BEVIN BROS. MFG. CO., Easthampton, Conn.
Manufacturers of

Sleigh Bells, House, Tea, Hand, Gong Bells, &c.



Clipper Bicycles

are built to please the dealer and rider.

Are you in the bicycle business? If not, you can make it pay to handle Clippers. Buy direct from the manufacturer, and save the jobbers' profit. It will add considerable to your bank account. We want responsible dealers only. We may be able to interest you, in fact we are sure of it. Our policy is a protective one, and will please you. It protects against Scalpers and "Curb Stone Brokers."

Grand Rapids Cycle Co.,
Grand Rapids, Mich.

Every Year

the "STERLING" becomes more popular with dealers. They find it gives better satisfaction than any other wheel. No worry over repairs.

THE STERLING

(Built like a Watch.)

A wonderful, strong, light wheel, with a dozen points of superiority over all others. Our "new departure" catalogue (free) tells all about it.

STERLING CYCLE WORKS,
234 Carroll Ave., CHICAGO.

LOVELL DIAMOND CYCLES.

HIGHEST GRADE.

All Sizes and Prices. See our line before you purchase.

All the Latest Improvements.

FULLY GUARANTEED.



RACER-WEIGHT, 19 LBS.

JOHN P. LOVELL ARMS CO., M'f'rs,
BOSTON, - - MASS.

SEND FOR CATALOGUE, FREE TO ALL.

AGENTS WANTED.

Do you want to buy Bicycles CHEAP?

If so, write to us for prices on the Falcon No. 1, Falconess, Falcon Junior (boys' bicycle) and Hackney.

THE W. BINGHAM COMPANY,
CLEVELAND, OHIO.

DO YOU HANDLE BICYCLES? IF NOT, WHY NOT?

Handle

the

Bicycle

that is a

Money

Maker.

The Wellington

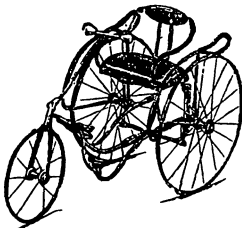
Is a Sure

Winner!

2 SIZES. No. 1, \$125.00, Weight 28 lbs.
No. 2, \$100.00, Weight 31 lbs.

Write for Terms and Discounts to Agents.

STOKES MFG. CO., Makers, - 298 Wabash Ave., Chicago.
WESTERN BRANCH, UNION CYCLE MFG. CO.



SOMETHING NEW!

THE "PERFECTION"

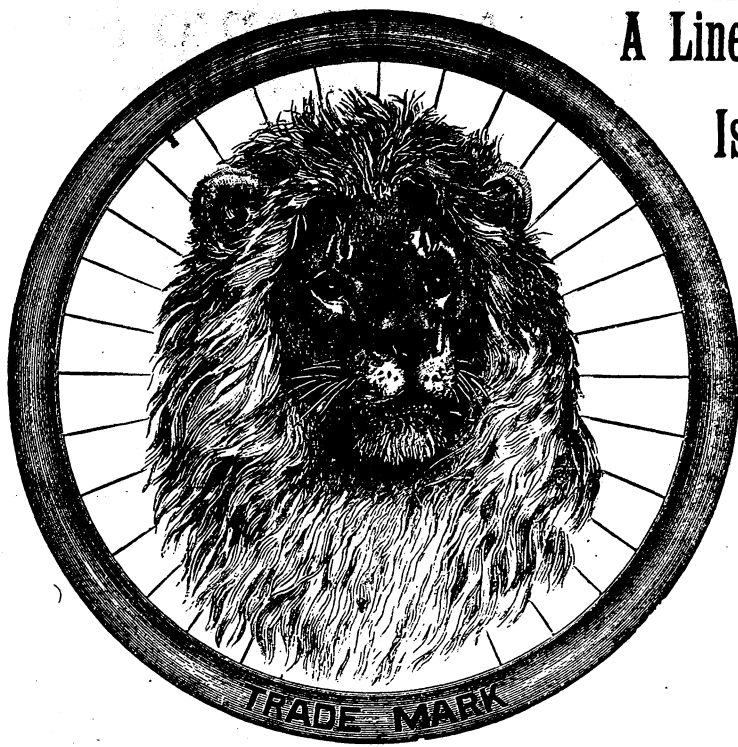
Ball
Bearing
Girls'

Run as easily as Bicycles. Cost about the same as old style parallel bearings. Sold by Hardware and Toy Jobbers. Manufactured by

The Toledo Metal Wheel Co, Toledo, O. Tricycles.

Key,
Halter,
Plumbers',
Staking Out,
CHAINS
Martingale,
Sash and Coil,
Breast,
Dog,

KELLEY & McBEAN, Niagara Falls, N. Y., U. S. A.



A Line of Hardware

Is not Complete Without

MONARCH BICYCLES.

They will make you more money than anything you can handle.

At the World's Columbian Exposition they received a general award for all points, including

Design, Workmanship and Finish.

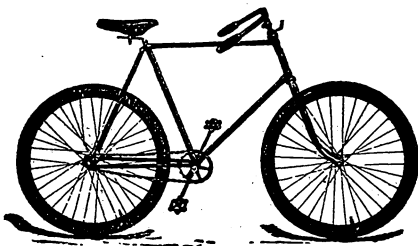
Prices, \$90.00, \$100.00, \$125.00.

Weights, 25 to 34 pounds.

Send for twenty-four page catalogue.

MONARCH CYCLE CO., Lake & Halsted Sts. Chicago, Ill.

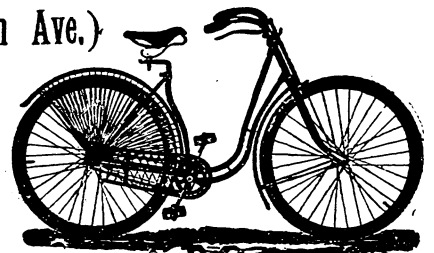
(Retail Salesroom, No. 280 Wabash Ave.)



C. F. CUYON CO.,

Nos. 97 and 99 Reade St., New York,

Genl. Eastern Distributing and Sales Agents.



THE CRAWFORD MFG. CO.

MAKERS OF

HIGH GRADE AND JUVENILE

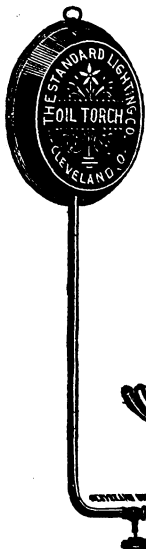
BICYCLES,

FACTORY, HAGERSTOWN, MD.

NEW YORK OFFICE, 72 READE STREET. L. B. Whymper, Mgr.

LIGHT YOUR DARK SHOPS CHEAPLY.

Give your men plenty of Light and they will do double work.

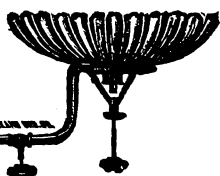


The Wall Torch has been used for several years as a means of illumination in Mills, Foundries, Machine and Car Shops, Tunnels, Street Stands, Band Stands, Smith Shops, etc.

While there are many cheap, inferior torches made which injure the sale of a good article, and condemn the Torch in general, our "Incandescent" Wall Torches are recognized as the best, and are now in use in the largest manufacturing establishments in the country giving **PERFECT SATISFACTION**, as is evidenced by the **DUPLICATE ORDERS** we receive from year to year.

They burn 150° Coal Oil, or 74° Naphtha, requiring a different burner for each.

In ordering be careful to state which is desired.



Price, for Single Torch, complete, \$2 each.

SPECIAL PRICE QUOTED FOR QUANTITIES.

THE STANDARD LIGHTING CO.,

100 to 118 Perkins Ave., - - - Cleveland, Ohio,

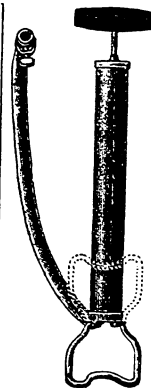
HEATH'S

BALL VALVE PUMP

AND

UNIVERSAL COUPLING,

For Bicycle and Sulky Wheels.



The handiest, windiest, strongest pump in the world at any price.

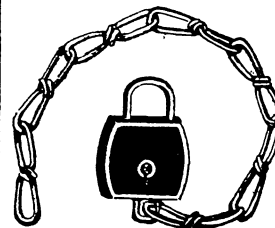
Price \$2.00.

Liberal discount to the trade.

Manufactured by

S. F. HEATH CYCLE CO.,

Minneapolis, Minn.



New Design,
Superior Construction
in Self-Locking

**Irene Bicycle
PAD LOCKS.**

Hardened chain
attached to bottom,
making it adjustable in
length. Two flat

Keys. Weight complete, 1½ oz. For circular and prices address

W. H. DIEFFENBACHER & CO.,

154 Lake Street, Chicago.

**COMMON MOUSE TRAPS
BEST FOR USE!**

Ripley Mfg. Co., Unionville, Conn.



Porcelain-Lined Lemon Squeezers, Steak Hammers, Boot Jacks, Magnetic Tack Hammers, Hallets, Bung-Starts, Hand Screws, Beacon Hill Pat. Mouse Traps, Sunny-Side 2 lb. Lap Board.

DAME, STODDARD & KENDALL,

374 Washington St., Boston, Mass.

IMPORTERS, MANUFACTURERS' AGENTS AND JOBBERS OF FINE FISHING TACKLE.

OUR LEADING SPECIALTIES ARE:

Skinner's Celebrated Fluted Trolling Spoons.

Patent Adjustable Floats and Sinkers.

Bray Fly Books.

"Neverbreak" Split Bamboo Rods.

"Neverbreak" Braided Silk Lines.

Crosby's Hunting Hatchets.

Littlefield's Collapsing Net Ring and Staff,

The Latest and Best Ring on the Market.

SEND FOR OUR NEW CATALOGUE.

THE SAMUEL WINSLOW SKATE MFG. CO.,

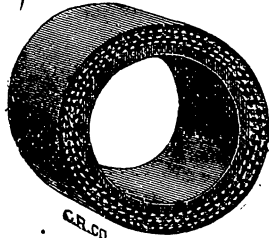
Worcester,



Mass., U. S. A

The most extensive Skate Factory in the World.

NEW SEAMLESS TUBE



SALES OF
Over Two Million Feet

GARDEN HOSE

alone during the past year, distributed throughout the United States, and not a single piece complained of, justifies us in guaranteeing that it will give absolute satisfaction.

Who Has Not Had Bad Hose?

Who has not lost time, patience, money, by attempting settlement for such goods?

THE CAUSE in nine cases out of ten is the lapped seam.
THE REMEDY is in buying our

PATENT SEAMLESS TUBE HOSE,

made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.

Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers', Cotton Hose, &c.

Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

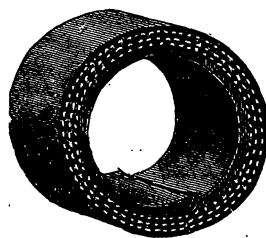
CLEVELAND RUBBER WORKS

of the Mechanical Rubber Co.,

CLEVELAND, O.

Makers of Mechanical Rubber Goods, Clothing, Druggists' Sundries, Specialties, Etc.

OLD LAPPED TUBE



We were awarded an order of 25,000 ft. for World's Fair of our celebrated

Seamless-Tube COTTON RUBBER-LINED HOSE

We Want Your Trade. Send for 60-page Catalogue. Write for Prices and Samples.

"Originators of Steel Hollow Ware."

PIONEERS OF HEAVY METAL STAMPING.

Flat

POLISHED—TINNED—ENAMELED

"SILVER STEEL"

Steel Washers.

HOLLOW WARE.

Steel Pipe Hooks.

ALL KINDS OF

HEAVY and LIGHT STAMPING, BLANKING, Etc., Etc.

CLEAN and WHOLESOME.

SPIDERS,

GRIDDLES,

KETTLES,

MASLINS,

SCOTCH-BOWLS,

HOTEL-WARE.

THE AVERY STAMPING CO.,

- - -

CLEVELAND, O.

IMPROVED EDITION OF THE IRON AGE HARDWARE PRICE BOOKS.

Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

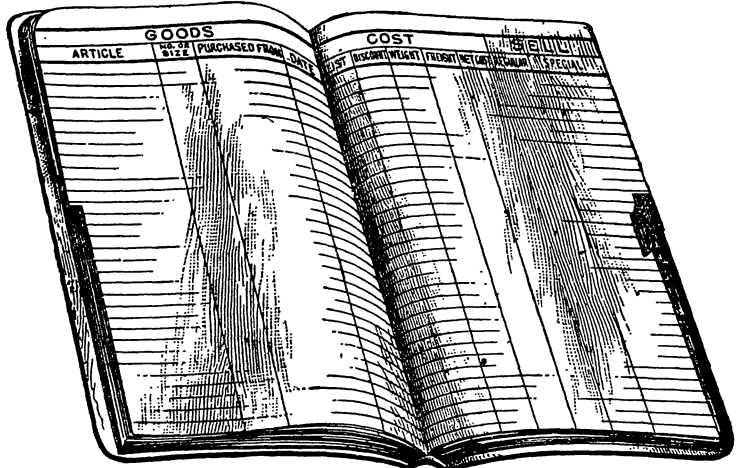
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price, or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

A, 200 pages, - - - - -	\$1.00
A F, 200 pages with flap, - - - - -	1.25
A 2, 400 pages, - - - - -	1.50
A F 2, 400 pages with flap, - - - - -	1.75



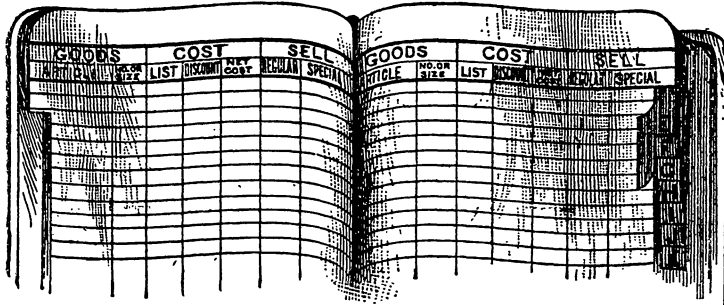
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

B, 200 pages - - - - -	\$1.00
B F, 200 pages with flap, - - - - -	1.25
B 2, 400 pages, - - - - -	1.50
B F 2, 400 pages with flap, - - - - -	1.75



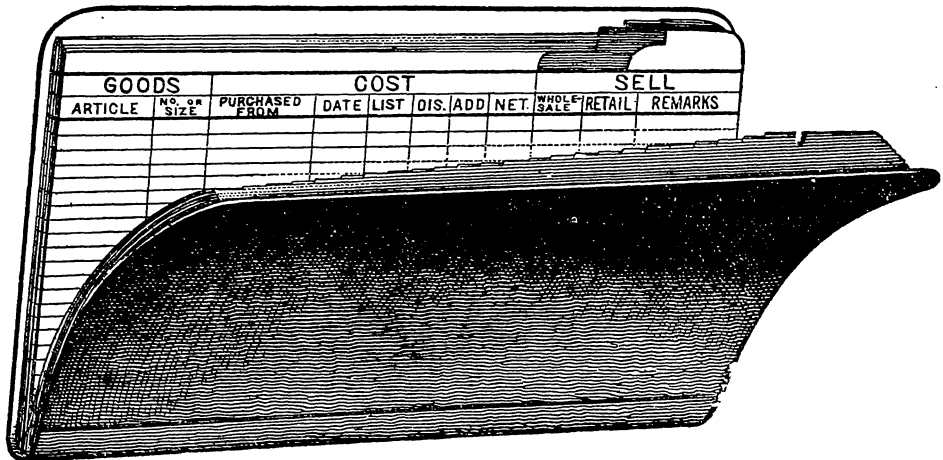
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

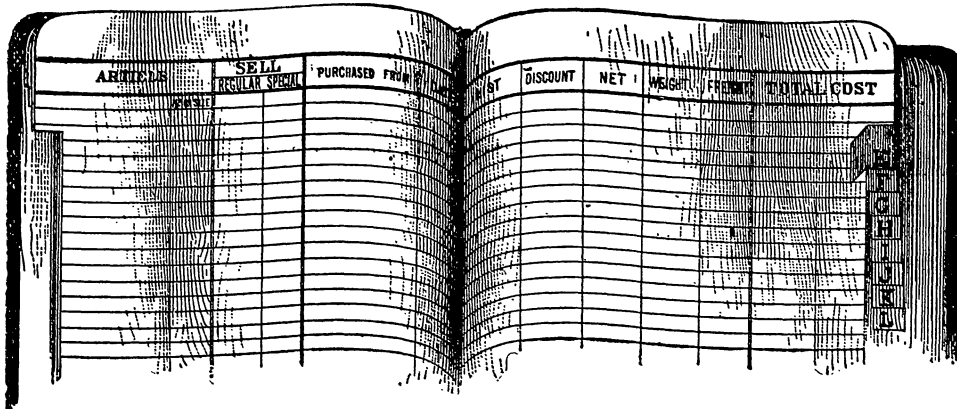
Size, 4½ x 7½ in.; grain seal leather.

() FOUR EDITIONS.

C, 200 pages, - - - - -	\$1.00
C F, 200 pages with flap, - - - - -	1.25
C 2, 400 pages, - - - - -	1.50
C F 2, 400 pages with flap, - - - - -	1.75



Hardware Price Book C.



Hardware Price Book D.

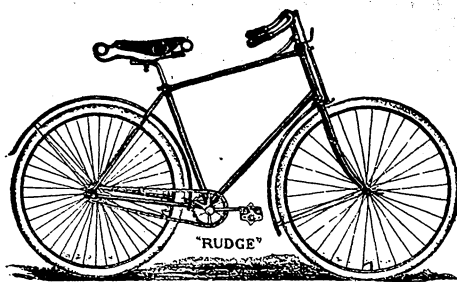
arrangement is adapted to the requirements of the trade in this direction. Size 5¼ x 8 in.; grain seal leather.

FOUR EDITIONS.	D, 200 pages, - - - - -	\$2.00	D 2, 400 pages, - - - - -	\$3.00
	D F, 200 pages, with flap, - - - - -	2.50	D F 2, 400 pages, with flap, - - - - -	3.50

Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This ar-

Sent post-paid, on receipt of price by **DAVID WILLIAMS, Publisher, 96-102 Reade St., New York.**



HARDWARE DEALERS AND RUDGE CYCLES.

Agents wanted immediately for unoccupied territory. Write for illustrated catalogue and Price-list of 1894 Wheels.

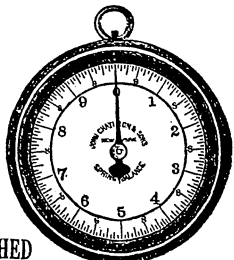
The Bronson Supply Co.,

Sole Agents for the United States.

72 Beekman St., New York.

John Chatillon & Sons,

85, 87, 89, 91, 93 CLIFF ST., NEW YORK.

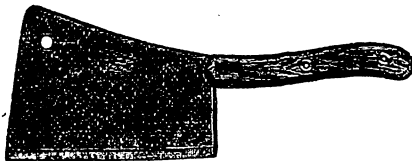


ESTABLISHED
1835.

SEND FOR
PRICE-LIST.



Sole Agents for
Foster Bros.' Butchers' Cutlery.



John Chatillon & Sons, N. Y.

American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet
Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

Magical Experiments; or, Science in Play.
By ARTHUR GOOD. Translated by CAMDEN CONWEN
and ROY WATERS. The experiments explained in-
clude some designed merely for recreation, with
many really scientific in character. These latter
are given with a view of stimulating an interest in
the study of physics. 320 pages, illustrated, 8vo,
cloth.....\$2.00

For sale by David Williams, 96-102 Reade St., N. Y.



No. 3

Globe Street Lamp.

Light your Streets and Driveways.

The S. G. & L. CO.

Tubular Globe

Street Lamp

IS THE Best Street Lamp Manufactured.

Equal to the best Gas Light.

Will not Blow Out in the Strongest Wind.

Will not Smoke.

Will not Freeze.

Automatic Extinguisher.

Outside Wick Regulator.

Will Burn Four Hours for One Cent.

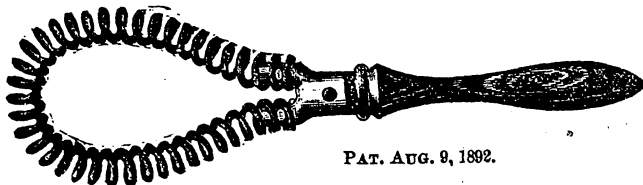
MANUFACTURED BY

STEAM GAUGE AND LANTERN CO.,

SYRACUSE, N. Y.

Western Branch, 25 Lake St., Chicago, Ill.

THE BOSS DUST BEATER.



PAT. AUG. 9, 1892.

NEAT, DURABLE, AND DOES THE BUSINESS.

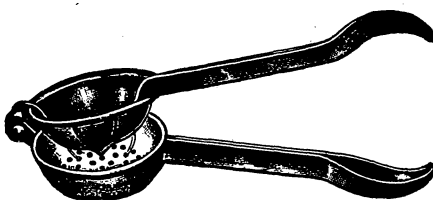
For removing dust and filth from Clothing, Upholstered Furniture, Rugs and Carpets it is just the thing. Will raise the nap and so improve the appearance. Will not, like other Dust Beaters, leave marks, nor tear the fabric. The coil is of steel wire secured in a malleable iron socket and attached to an enameled wooden handle. Just what everybody wants.

Sent by Mail, 35 Cents.

PEABODY & PARKS,

Manufacturers,

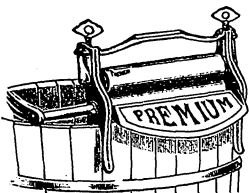
TROY, N. Y.



Do you make Lemonade?

If so you want our Squeezer. Positively the best. Suitable for any size Lemon. Write for catalogue and prices.

BERGER BROS., 237 Arch St., Philadelphia, Pa.



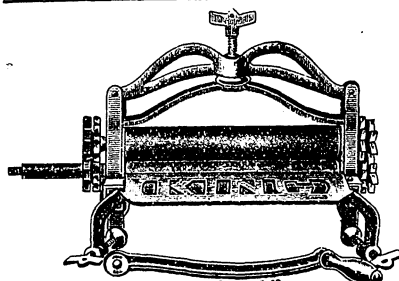
COLBY WRINGER CO., Montpelier, Vt.

MANUFACTURERS OF THE

Premium Wringer,

With Automatic Apron Adjustment.

SURPLESS, DUNN & ALDER, Direct Representatives,
27 Chambers Street, New York.



We are Sole Manufacturers of the
Celebrated Erie and King Wringers.

We also make all other brands of Wood and Iron
Frame Wringers.

Exclusive sale of the **ERIE** and **KING** Wringers
given to one dealer in each town.

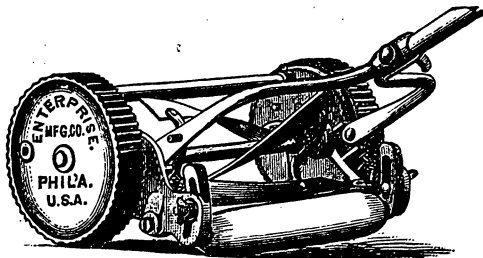
Write for Catalogue.

THE NATIONAL WRINGER CO., CANTON, OHIO.

New York Office, 107 Chambers St., John T. Ryan, Mgr.

THE ENTERPRISE M'FG CO. OF PA.,

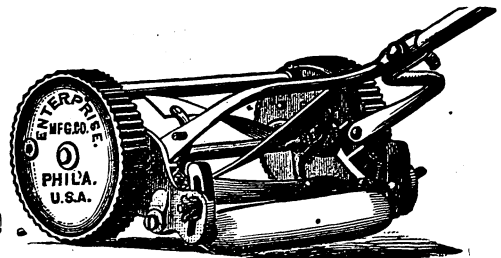
Third and Dauphin Sts.,
Philadelphia, U. S. A.



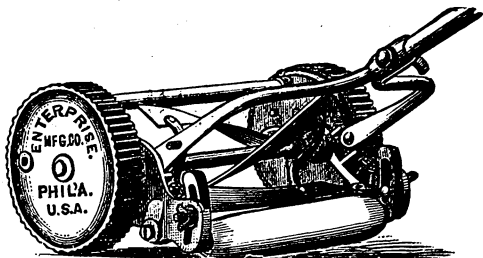
7, 9, 11, 13, 15 inches.

— O —
PAINTED
and

— TINNED. —

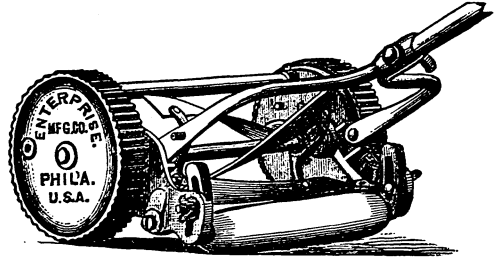


ENTERPRISE LAWN MOWERS!



EQUAL TO
the
BEST.

— O —
Prices quoted
on Application.

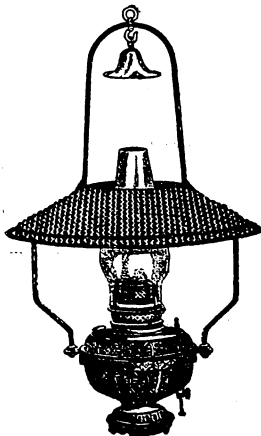


FOR SALE BY THE HARDWARE TRADE.

Branch Office and Warehouse with J. C. McCarty & Co., 97 Chambers Street, New York City.

SEND FOR CATALOGUE, FREE.

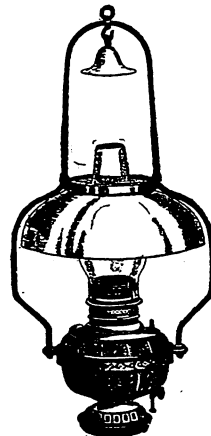
THE LAMP TO LIGHT YOUR STORE. MAMMOTH CENTRAL DRAFT BANNER.



With 20-inch Tin Shade.

No. 858. Size 3.

Enlarged Oil Pot
No Smoke.
No Smell.
Cheaper and Better than Gas.
300 Candle Power.
Holds One Gallon Oil.
Burns Brightly about 10 hours.



With 14-inch Dome Shade.

The Banner is the only Fount having Extra Feeder Wick which supplies oil to the Burning Wick. Harp has our Patent Extension Band, allowing Fount to pass down and through instead of lifting over as in the old style harp. Flame is regulated by our Improved Ratchet Movement. This Movement gives an exactness and nicety in adjusting that is not possible in any other wick raising device.

— MANUFACTURED ONLY BY —

THE PLUME & ATWOOD MFG. CO.,
NEW YORK. BOSTON. CHICAGO.

S. & P. SOUP DIGESTERS.

Tinned or Enameled.

With Steam Valve and Covers Ground to Fit Tightly.

The aroma is saved.

The only practical mode of making delicious soups.

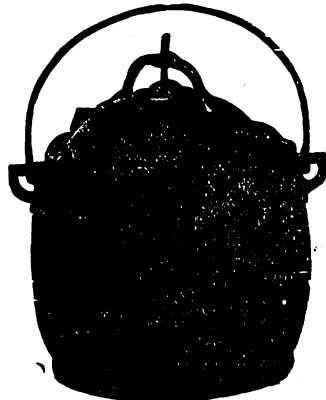
It has often been remarked that the French cooks can make excellent soup out of what others throw away. The secret is they use proper appliances.

Sizes, 4, 6, 7, 8 and 10 Qt., 3, 3½, 4, 5 and 6 Gal.

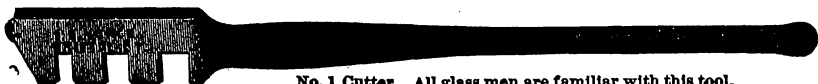
WRITE FOR PRICES.

THE STUART & PETERSON CO.,

Burlington, N. J., U. S. A.

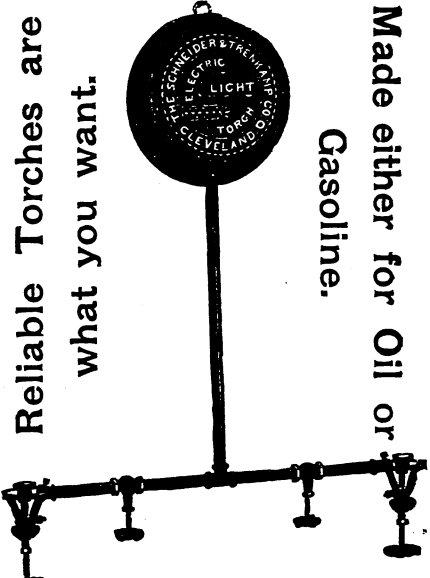


MONCE'S NOVELTY GLASS CUTTERS. — INTERCHANGEABLE LOCK STENCILS



No. 1 Cutter. All glass men are familiar with this tool.

S. G. MONCE, — BRISTOL, CONN.



Reliable Torches are

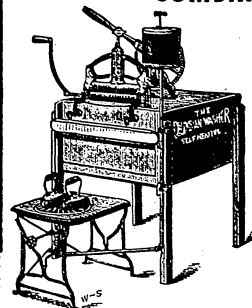
what you want.

Made either for Oil or
Gasoline.

These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at all expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

Write us for prices. A liberal discount given to the trade. Manufactured by
THE SCHNEIDER & TRENKAMP CO.,
Nos. 479 to 497 Case Ave., Cleveland, Ohio.

COLUMBIAN WASHER and STOVE COMBINED.

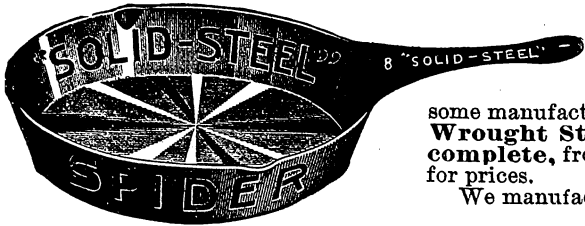


The most complete washer on the market.

**Benbow
M'fg Co.,**
St. Louis.

PHILLIPS SCREENS

Are Reliable.

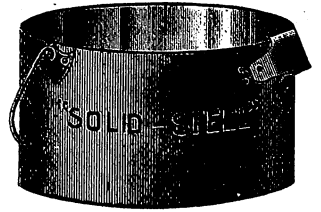
"SOLID-STEEL" SEAMLESS HOLLOW WARE.

No Seams, no Rivets in "Solid-Steel" Ware.

Brilliant Finish.

Notwithstanding the claims made by some manufacturers' agents our spiders are made from Wrought Steel, Without Seams or Rivets, complete, from a single piece of metal. Write for prices.

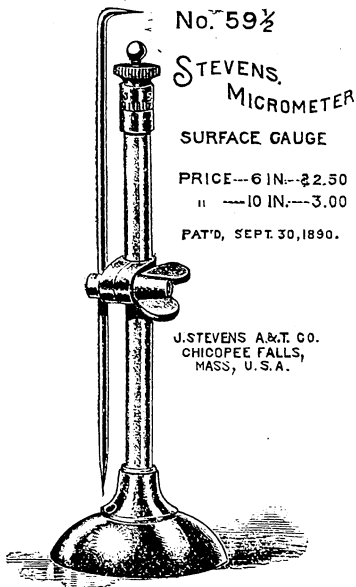
We manufacture our own goods.



"Solid-Steel" Maelin Kettle.

The Cleveland Stamping & Tool Co., Cleveland, O.

We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.

FINEST MECHANICAL TOOLS.

No. 59½

STEVENS
MICROMETER

SURFACE GAUGE

PRICE—6 IN.—\$2.50

" —10 IN.—3.00

PAT'D, SEPT. 30, 1890.

J. STEVENS A.&T. CO.
CHICOPEE FALLS,
MASS., U. S. A.

**SELL ONLY THE
BEST.**



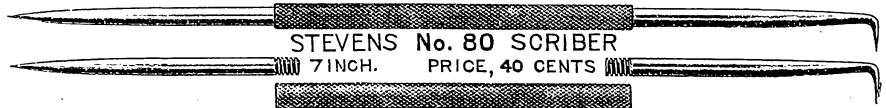
No. 130

STEVENS ADJUSTABLE SCRATCH GAUGE
WITH FINE ADJUSTMENT.PRICE
PLAIN ADJUSTMENT—6 IN.—\$1.75
MICROMETER " —6 IN.—2.00J. STEVENS' ARMS & TOOL CO.
CHICOPEE FALLS, MASS., U. S. A.

J. Stevens Arms & Tool Co.,

P. O. BOX, 5729,

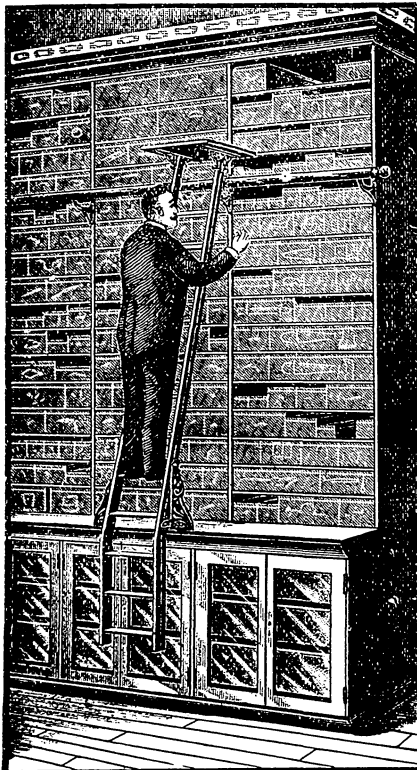
Chicopee Falls, - - Mass



STEVENS No. 80 SCRIBER

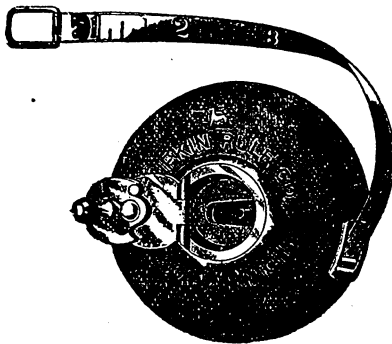
7 INCH.

PRICE, 40 CENTS

**THE BICYCLE STEP LADDER.**

Highest Award, Columbian Exposition.
The Newest, Neatest, Simplest, Easiest Operated
and Safest Store Ladder made.
Ladders are not Suspended, but Supported from
below on wheels. Move easier with operator on than
others when empty. Highly finished, and very hand-
some. Made in different grades and prices to suit.
Send for illustrated catalogue and prices.
See this space next week for other styles.

The Bicycle Step Ladder Co., 50 State Street,
Chicago, Ill.

**"RELIABLE"
Steel Measuring Tapes.**

Entirely new. Handle or crank when closed
is perfectly flush with leather case. Opens by
pressing button on opposite side and folds out
double, giving increased leverage. Best and
most convenient steel tape on the market.
Fully guaranteed. Will send samples on ap-
proval. We carry a complete stock of our
goods at our New York Office, 20 Murray St.

LUFKIN RULE CO., Saginaw, Mich.

**WHY USE WOODEN OR HEAVY STEEL BLOCKS
WHEN THE STEEL AND IRON**

TACKLE BLOCKS

—MADE BY—

The Cleveland Block Co.,

CLEVELAND, OHIO, U. S. A.,

ARE BETTER IN EVERY WAY.

No waste material. Every ounce of weight in the line of
strength. No clumsy outside straps or bolts. As light as
wooden blocks and vastly more durable. They wear, but never
break. Sheaves interchangeable

General Agents: Topping Brothers, 92 Chambers Street, New York,
New England Agents, - Dodge, Halby & Co., 212 High Street, Boston.

CHANTRELL TOOL CO.,

— MANUFACTURERS OF —

NAIL PULLERS.

TWO PATTERNS.

1890—NICKEL PLATED, SPRING IN JAW.

1891—GIANT PATTERN, “ “ “

WARRANTED.

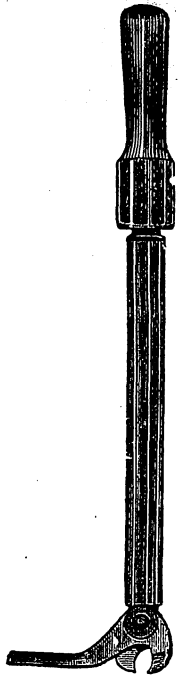
TOOL HANDLES.

No. 21, COCOBOLA HANDLE, TEN TOOLS.

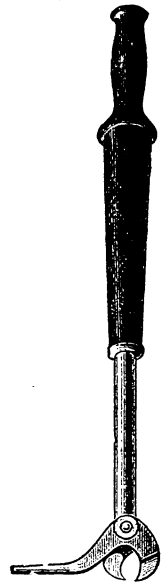
No. 2, LARGE, “ EIGHT “

STANDARD SCREW DRIVERS,

Round Forged Blades, Mahogany Handles.



1890.



1891.

GENERAL AGENTS,

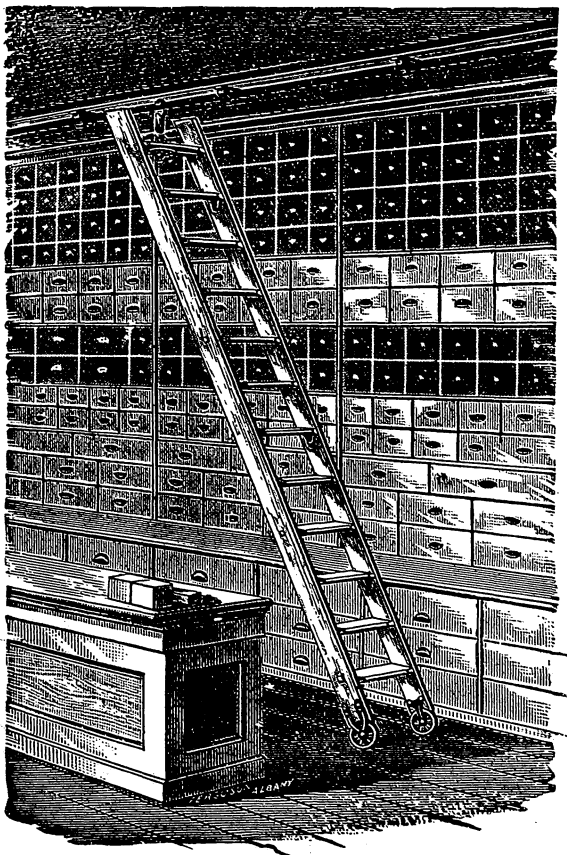
JOHN H. GRAHAM & CO.,

113 Chambers St.,

N. Y. CITY, N. Y.

WRITE FOR PRICES.

THE “NOISELESS” STORE LADDER.



The latest and best. Perfectly noiseless. Neat in appearance,

Manufactured by

M. CROISSANT,

ALBANY, N. Y.

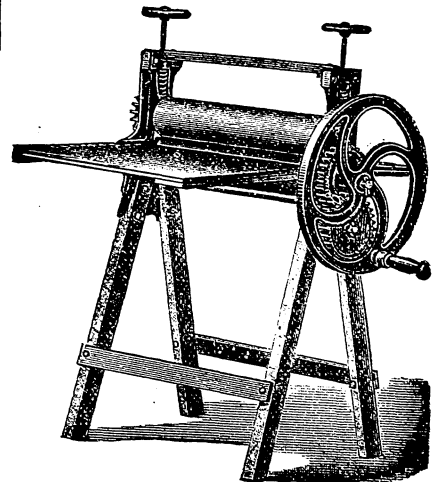
The Family Mangle.

WARRANTED TO DO

Better Work than Hand-Work.

SAVES all the fuel,
two-thirds the work.
Keeps the linen whiter.

We Guarantee Every Machine.



Send for descriptive circular to

S. C. Johnson, Racine, Wis.

Agents Wanted.

PHILLIPS SCREENS

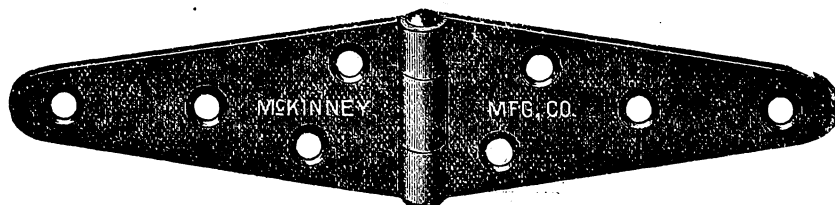
Are Reliable.

STEEL HINGES AND BUTTS.

STANDARD GOODS.

McKINNEY MFG. CO. - ALLEGHENY, PENN.

SEND FOR
LIST.



ORDERS FILLED
ON SIGHT.

"NONE BETTER."

BARN, MILL AND FIRE DOOR HANGERS HIGHEST AWARD

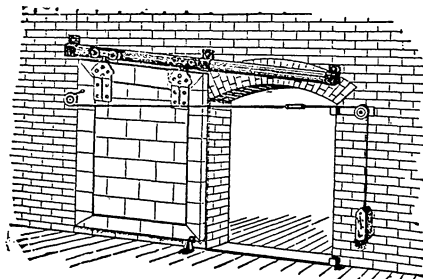
at WORLD'S FAIR, 1893,

—: ON:—

Parlor, Barn and Fire Door
Hangers.

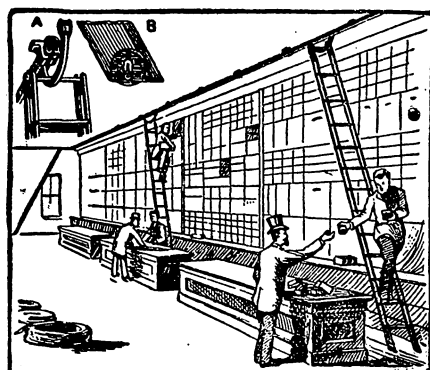
SEND FOR CATALOGUE.

COBURN TROLLEY TRACK MFG. CO.
HOLYOKE, MASS.



Fire Door Hangers. Best in the World. Equipped with Automatic Fire Door Fittings.

We make four styles of ROLLING LADDERS to reach shelving of any height.



P. & F. CORBIN,

New Britain, Conn.

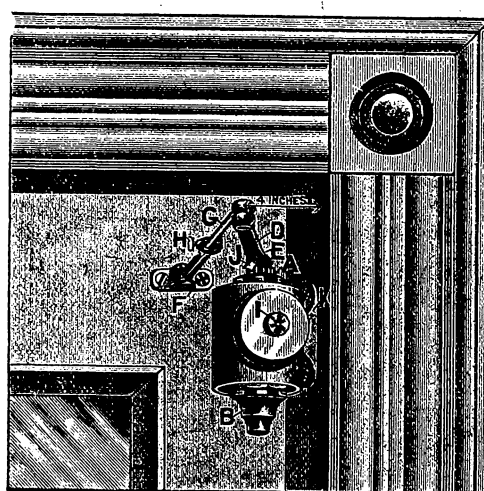
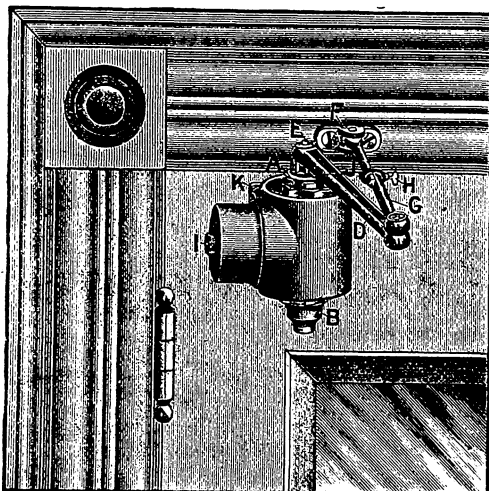
New York.

Philadelphia.

Chicago.

—) MANUFACTURERS OF (—

Easily
Adjusted
and Adapted
for all
Requirements.



Looks Well,
Acts Well,
Wears Well.

LIQUID DOOR CHECKS AND SPRINGS,

Fine Builders' Hardware. Wood AND Machine Screws.

Catalogues and Prices Furnished on Application.

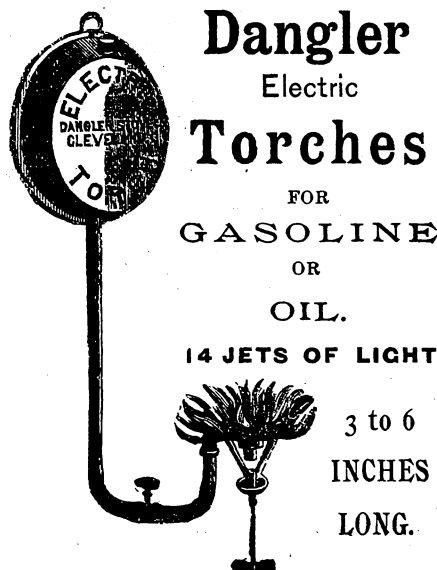
READING HARDWARE COMPANY.

Our productions in Artistic Hardware are unsurpassed for variety and beauty of Designs and Patterns, fineness of Finish and excellence of Material and Workmanship.

"Vassar" Cylinder Locks are Best and Safest.

NEW YORK, PHILA., CHICAGO.

Factories, READING, P.A.



Dangler Electric Torches

FOR
GASOLINE
OR
OIL.

14 JETS OF LIGHT

3 to 6
INCHES
LONG.

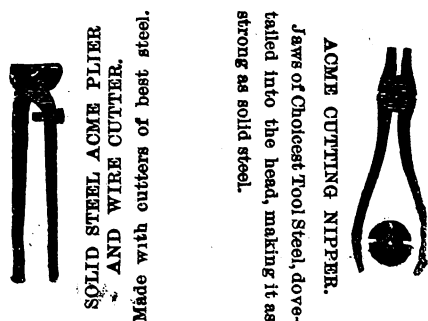
FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable, brilliant, steady light, and by cheaper means than by Coal Gas.

SOLE MANUFACTURERS,

The Dangler Stove & Mfg. Co.,
Cleveland, Ohio.

ACME CUTTING TOOLS.

Made in all Sizes.



HIGGANUM HARDWARE CO., HIGGANUM, CONN.

New York Office, 18 Cliff Street.

JONES' PATENT HOSE MENDER.

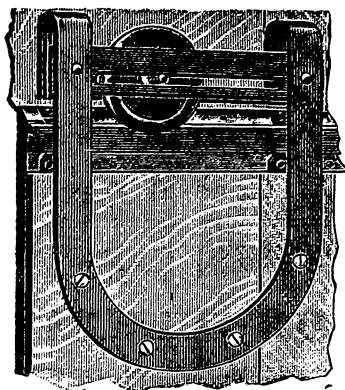


Best and Cheapest.

Does not obstruct flow of water. No tools or bands required.

$\frac{1}{8}$ in. 40c., $\frac{1}{4}$ in. 50c., 1 in. 85c. # doz.

M. D. JONES & CO., Liberal Discount to Dealers.
368 Washington St., Boston.



HIGHEST AWARD
WORLD'S
COLUMBIAN EXPOSITION

BARN DOOR HANGERS.

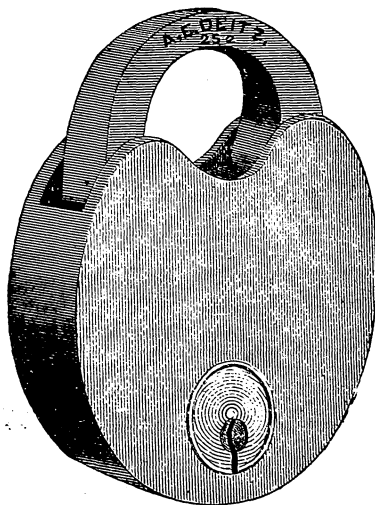
For catalogue and prices, address

Chicago Spring Butt Co.,

CHICAGO, ILL.,

or 97 CHAMBERS ST., N. Y.

A. E. DEITZ



J. C. McCARTY & CO., Agents,
97 Chambers and 81 Reade Sts., New York.

Factory, BROOKLYN, E. D., N. Y.

—: OUR:—

PURE ALUMINUM COOKING UTENSILS

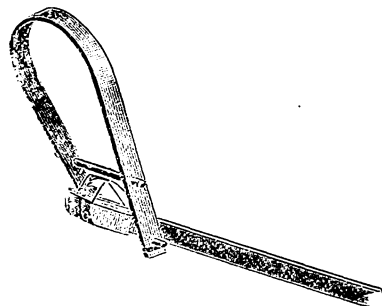
Meeting with such universal appreciation, we think it to our interest to appoint ONE responsible firm of Hardware Merchants in EACH town and city as our sole agents.

ILLINOIS PURE ALUMINUM CO.,
LEMONT, ILLINOIS.

Manufacturers of Sheets, Medals, Utensils.

Improved American.

PATENT PENDING.

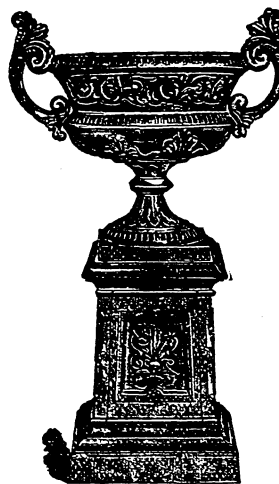


THE BISHOP POKES are the best, as they are made from good material, are very strong, and have all the latest improvements up to date. Shun other pokes said to be just as good, for they are not. For names of Bishop Pokes we refer to price-list in *Iron Age*. They are for sale by nearly every jobber of hardware in the U. S.

A. W. BISHOP,
MAKER,

BEREA, - - - OHIO.

IRON RESERVOIR VASES.



Nearly 100
styles and
sizes.

List prices
from \$6.00
to \$100.00
each.

These Vases are made with a reservoir for water, from which a constant and even supply of moisture is drawn by capillary attraction, and they do not need watering often—more than once in ten or fifteen days. Thousands of Reservoir Vases are in

use on lawns and in cemeteries all over the country. Our prices are no higher than those of ordinary vases.

Catalogue sent on application.

WALBRIDGE & CO.,
BUFFALO, N. Y.

HOWARD IRON WORKS,

BUFFALO, N. Y.,

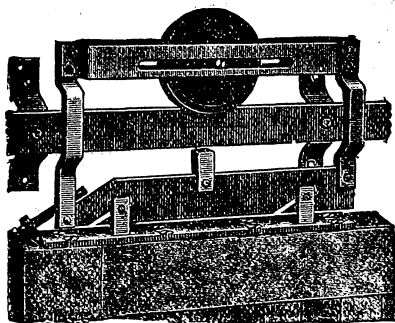
Manufacturers of

BOLT CUTTERS

AND NUT TAPPING MACHINES,

(Schlenker's Patent),

Send for Illustrated Catalogue.



LANE'S PATENT NOISELESS STEEL PARLOR DOOR HANGER.

This Hanger is made of Steel.
The Wheel is also Steel, except the filling or tread.
The Track is of Steel—a single one only.
The Hanger is Anti-Friction.
More nearly Noiseless than any other.
Ease of adjustment.

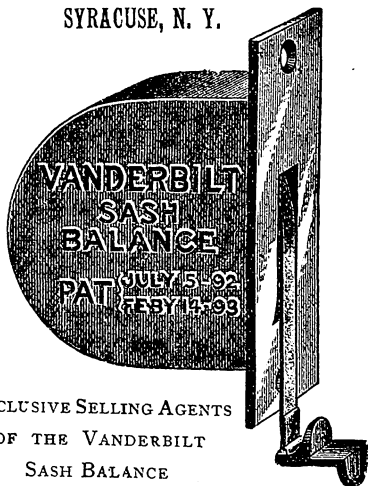
Can be erected with half the labor others require.
Track will not swell, shrink or warp out of true.
No cutting of doors.
No matching of hardware.
Simplicity in all its parts.
Durability.

ALSO LANE BARN DOOR HANGER AND TRACK. SEND FOR CIRCULARS.

Manufactured by

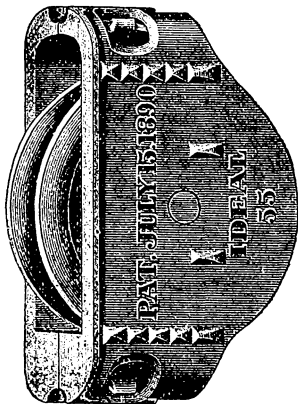
LANE BROS., Poughkeepsie, N. Y.
JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., New York.

E. C. STEARNS & CO.,
SYRACUSE, N. Y.



EXCLUSIVE SELLING AGENTS
OF THE VANDERBILT
SASH BALANCE

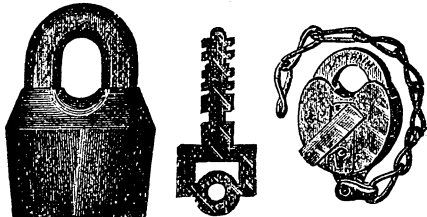
Ideal Sash Pulley, No. 55.



Adapted for auger socket or machine made mortise. Applied without chisel or screws, quickly and a perfect fit in every case. The only all round Sash Pulley made. Sample free. Price on application.

STOVER MFG. CO.,
145 River St., Freeport, Ill.

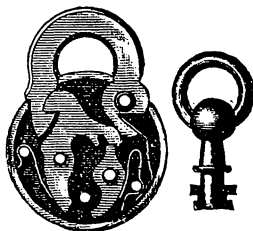
ESTABLISHED 1879.
KEYSTONE LOCK WORKS,
E. T. FRAIM, Lancaster, Pa., U. S. A.



Originators, designers, patentees and manufacturers of all the leading popular styles of **PADLOCKS**, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. **SELF-LOCKING** Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 131 different kinds. Write for our new 100-page catalogue.

SURPLESS, DUNN & ALDER, General Agents,
97 Chambers St., NEW YORK.

PATENT PERFECTION PADLOCK.



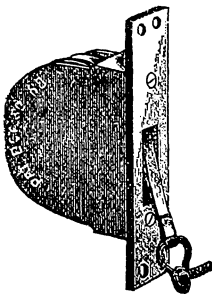
Eight Tumblers, Key Turning Both Ways.

Sizes, $\frac{1}{4}$ inch to $2\frac{1}{4}$ inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{2}$ and $\frac{3}{8}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.

Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

Send for Price-Lists and Circulars.



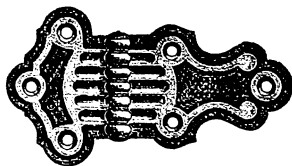
DOES IT PAY?

To buy an inferior article, which your trade condemns, when you can get

THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the **LEADER** for five years. Write to

CALDWELL MFG. CO., Rochester, N. Y.



CORRUGATED WROUGHT BRASS HINGES,

FOR REFRIGERATORS, ETC.

Original and Striking Designs in a Great Variety of Finishes.

SEND FOR PRICE-LIST.

THE STANLEY WORKS, NEW BRITAIN, CONN.,
79 CHAMBERS STREET, N.Y.



PHILLIPS SCREENS

Are Reliable.

THE SCHULTZE LOCK UNPICKABLE.

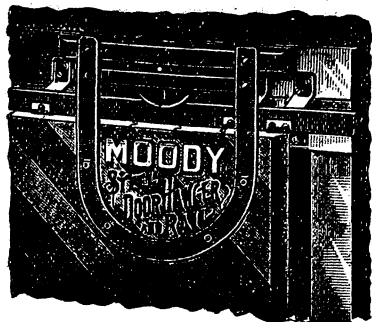


SEND FOR CIRCULAR.

MANUFACTURED ONLY BY

The Schultze Mfg. Co.,
Cor. Emerald & Wishart Sts., Phila., Pa.

VICTOR MFG. CO., Newburyport, Mass.

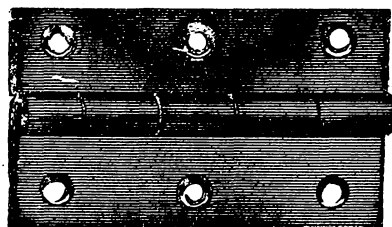
STEEL RAIL.

Showing one-half set of hangers attached to door.



The Only Bracing Bracket Made.

HANGERS.	PRICE-LIST.	Per Doz. prs
No. 5, to run 6 feet, 3 1/4 in. wheel,	-	\$10.00
No. 6, to run 10 feet, 4 1/4 in. wheel,	-	15.00
No. 7, to run 15 feet, 5 1/4 in. wheel,	-	22.00
RAIL, per foot.....		6 1/2 cents.

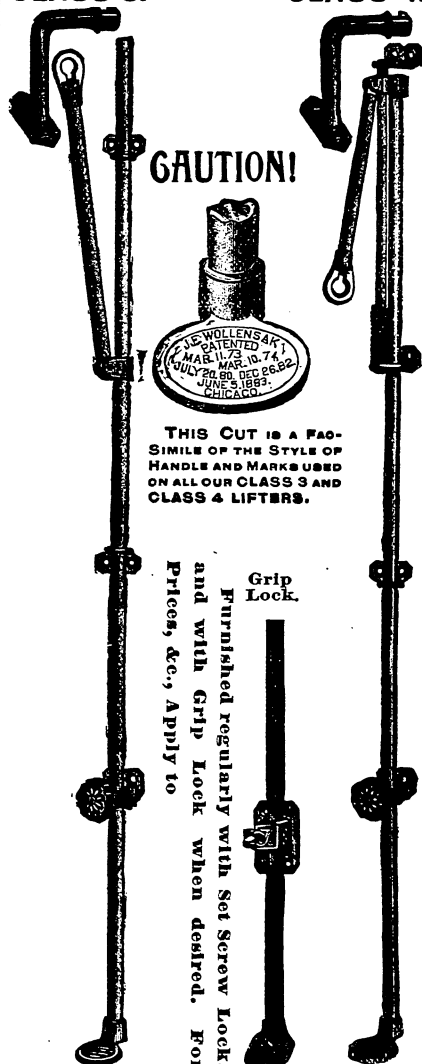
**Cast Brass Butt Hinges**

IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York,

MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.****Transom...Lifters**OLD RELIABLE**J. F. WOLLENSAK'S PATENT.****CLASS 3.****CLASS 4.****CAUTION!**

THIS CUT IS A FAO-SIMILE OF THE STYLE OF HANDLE AND MARKS USED ON ALL OUR CLASS 3 AND CLASS 4 LIFTERS.

Furnished regularly with Set Screw Lock, and with Grip Lock when desired. For Prices, &c., Apply to Grip Lock.

J. F. WOLLENSAK, - CHICAGO, ILL.**THE WILCOX & HOWE COMPANY,
BIRMINGHAM, CONN.,**

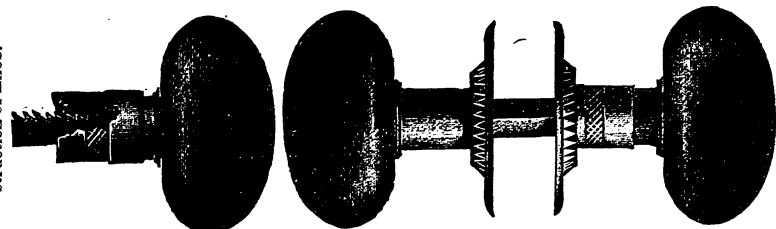
MANUFACTURERS OF

**A Full Line of Carriage Hardware
ALSO SPECIAL FORGINGS.**

Estimates cheerfully given. Send for Catalogue

SASH WEIGHTS**E. E. BROWN & CO.,****McKean and Meadow Sts.,
PHILADELPHIA, PA.**

Sectional cut showing construction of knob.



Half size cut of knob as applied to door. No side screws or adjusting washers.

Don't you want your stock to represent the latest and most improved up to date Hardware? The Whipple Patent Door Knob is the latest and best Door Knob attachment ever made. Give it a trial. **PERRY & WHIPPLE CO., New Haven, Conn.** New York Sales Agent, E. G. SHEPARD, 142 Chambers Street.**SASH WEIGHTS!****NORTON BROTHERS,**

Manufacturers,

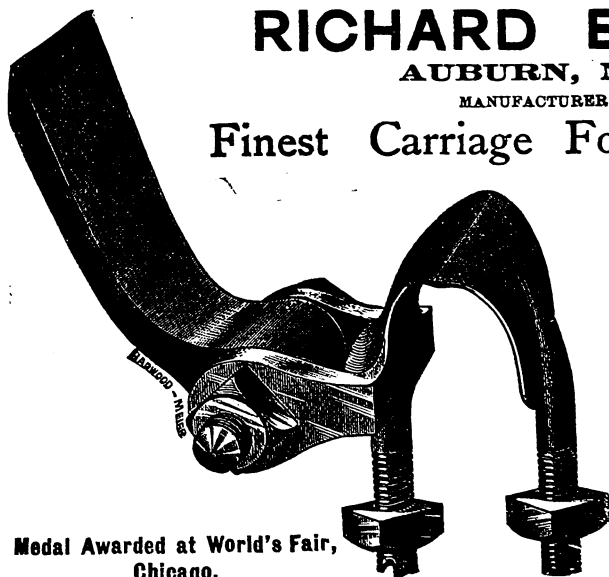
Office: 813 Masonic Temple, CHICAGO.

WORKS AT MAYWOOD, ILL.

RICHARD ECCLES,**AUBURN, N. Y.,**

MANUFACTURER OF

Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line Special Drop Forgings.

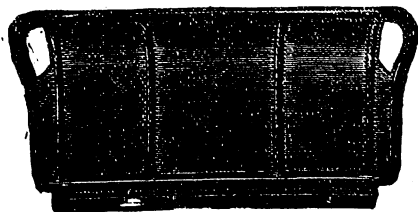


Medal Awarded at World's Fair, Chicago.

Send for New Catalogue for Season 1893-94

McKINNON DASH & HDW. CO.,**LIMITED, Manufacturers of****FINE QUALITY****DASHES**

AND

FENDERS,

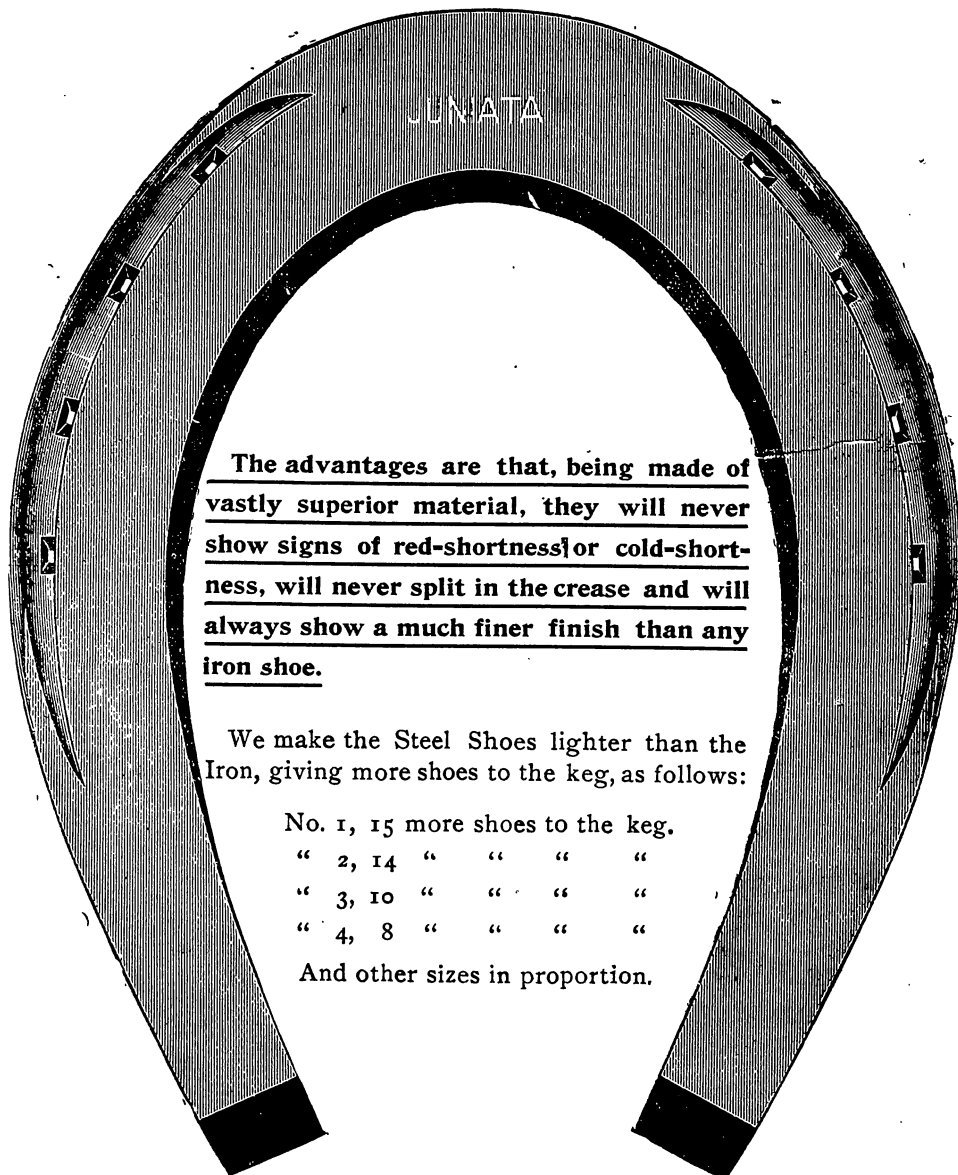
C PATTERN.

SURREY DASH.**BUFFALO. - N. Y.**

STEEL HORSE SHOES.

SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged, and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



The advantages are that, being made of vastly superior material, they will never show signs of red-shortness or cold-shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.

" 2, 14 " " " "

" 3, 10 " " " "

" 4, 8 " " " "

And other sizes in proportion.

No. 2 EXTRA SWAGED FRONT.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

We would also call your attention to our Improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities use sand or borax in welding on a calk and cool off at a dark red, or still better, cool off without plunging in water. We make sizes numbers 1, 2, 3, 4, 5 and 6, packed in 25-pound boxes.

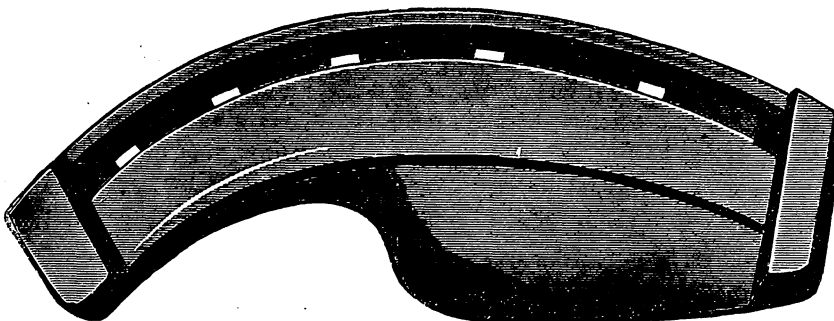
Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

SHOENBERGER & CO.,

JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

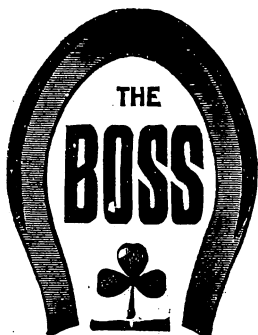
SCRANTON FORGING CO.,

SCRANTON, PA

CARRIAGE HARDWARE**SPECIAL DROP FORGINGS.****FORGED****OX****SHOES.**

Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.**HORSE AND MULE SHOES.**

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,**CATASAUQUA, PA.****RHODE ISLAND PERKINS HORSE SHOE CO.,**

MANUFACTURERS OF

Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Tee Weight Shoes and Goodenough Shoes.

Works at Valley Falls, R. I.

Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres.,

C. H. PERKINS, Gen. Manager,

R. W. COMSTOCK, Sec'y,

CHARLES B. STARK, Treas.

J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.**THE NEW DIAMOND STATE HORSE AND MULE SHOES.****JUST TRY THEM and YOU will say they excel all others.**

MANUFACTURED BY

DIAMOND STATE IRON CO.**WILMINGTON, DELAWARE.**

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blanks, Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

PHILADELPHIA OFFICE,
206 So. Fourth St.

{ Correspondence invited }

NEW YORK OFFICE,
11 Pine St.**Covert Pat. Adjustable Soldering Irons and Coppers**

It is a complete tool in every respect, and can be as easily adjusted at angle while hot as cold. The handle can be used indefinitely, as when the copper is worn out it can be replaced in the same handle, making the iron as good as new at about half the cost of the ordinary soldering iron.

**PATENT ADJUSTABLE COPPERS.**

A sample of $\frac{3}{4}$ in. soldering iron will be sent by mail, free of postage to any address, on receipt of sixty cents (60c.).

FOR SALE BY ALL GENERAL HARDWARE AND PLUMBERS' SUPPLY HOUSES.

COVERT MFG. CO., - West Troy, N. Y.**BURDEN'S****HORSE SHOES.****"Burden Best"****Iron****Boiler Rivets.****The Burden Iron Co.****TROY, N. Y.****PHOENIX****HORSE SHOES.****PHOENIX HORSE SHOE CO.,**

ROLLING MILLS AND FACTORIES,

Poughkeepsie, N. Y.**Joliet, Ill.**

NEW YORK OFFICE, No. 66 Reade St.


Standard Horse Shoe Co.,

Manufacturers of

HORSE AND MULE SHOES.

LEEDS, ROBINSON & CO., General Agents,

4 Liberty Square, Boston, Mass.

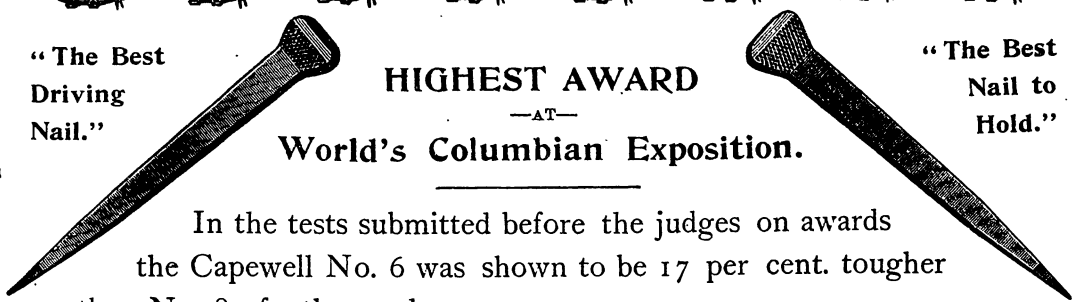


“The Best Driving Nail.”

HIGHEST AWARD
—AT—
World's Columbian Exposition.

“The Best Nail to Hold.”

In the tests submitted before the judges on awards the Capewell No. 6 was shown to be 17 per cent. tougher than No. 8 of other makes.




CAPEWELL HORSE NAILS,

—MADE BY—

THE CAPEWELL HORSE NAIL CO., - - - HARTFORD, CONN.

Office of D. C. BURNHAM,
Director of Works, World's Columbian Exposition,
JACKSON PARK, CHICAGO, ILL.

October 28, 1893.

TO THE CAPEWELL HORSE NAIL CO.:
Gentlemen—I have used your horse nails here on the horses belonging to the World's Columbian Exposition, and I think they are far superior to any others that I have ever used. As I have been in the horseshoeing business for about twenty-five years, I know what I am talking about.

Very respectfully,
HERMAN J. HENKE,
Foreman Blacksmith, World's Columbian Exposition.

The Capewell Patent Corrugated Horse Nail.

Needs No Clinching.



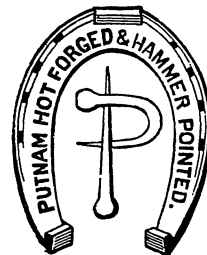

Highest Award

FOR

Supreme Excellence

TO

The **PUTNAM** Hot-Forged and
Hammer-Pointed Horse **NAILS,**



At the *World's Columbian Exposition* at Chicago. A medal and diploma worded:
“Supreme excellence in material, method in manufacture, and quality of finished product; elasticity and smoothness combined with holding power in clinch.
It allows the use of very small nails.”

There is nothing beyond “supreme excellence,” nor is there anything comprised in a horse nail, except the “material from which it is made,” “the method of manufacture,” and “quality of finished product.” Putnam nails, by their “elasticity,” give slightly to the expansion and contraction of the hoof while the horse is in motion; by their “smoothness,” do not enlarge the nail holes in the hoof, while their “supreme excellence,” in “holding power in the clinch,” enables them to hold the shoe in the hardest service until worn out.

By the “use of small nails,” large holes are avoided and money saved to the smith.

Thus it will be seen that the officials of the *World's Columbian Exposition* recognize what qualities go to make up a good horse nail and that only the “Putnam” contains them all.

PUTNAM NAIL CO.,

Neponset, Boston, Mass.

H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

CHAMPLAIN

Manufactured by the **NATIONAL HORSE NAIL CO.,**
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents, New York.



Elegant Iron.

Beautiful Shape.

HORSE SHOES,

Light, Medium and Heavy.

MULE SHOES,

Light, Medium and Heavy.

Illustrated booklet and prices to all parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,

ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.

Richmond, Va., U. S. A.

LE COUNT'S HEAVY STEEL DOG,

With Steel Screws. U. S. Standard and the points hardened.




1.....	\$6.....	\$0 40	13.....	2 1/4.....	\$1 35
2.....	7 1/2.....	50	14.....	2 1/2.....	1 45
3.....	8.....	60	15.....	3.....	1 60
4.....	9.....	60	16.....	3 1/2.....	1 80
5.....	10.....	70	17.....	4.....	2 10
6.....	11.....	80	18.....	4 1/2.....	2 75
7.....	12.....	90	19.....	5.....	3 25
8.....	13.....	95	20.....	5 1/2.....	4 00
9.....	14.....	100	21.....	6.....	5 00
10.....	15.....	110	22.....	7.....	6 00
11.....	16.....	120	23.....	8.....	7 00
12.....	17.....	130			
One small set of 8, by 1/4 in. to 2 in. 6 25					
One set of 12, by 1/4 in. to 2 in., continued by 1/2 in. to 4 in. 13 20					

When ordering, state as above, whether a full set, or a set of 12, or small set of 8, is wanted.

SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

C. W. LE COUNT, MANUFACTURER, SO. NORWALK, CONN., U. S. A.

These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.



P. F. BURKE, C. F. DENWICK & CO.
Manufacturers of
PATENT STEEL
(Blunt and Sharp)
TOE-CALKS.
—ALSO—
BURKE'S IMPROVED
HORSESHOERS'
FOOT VICE.
Send for Circulars.
360 Dorchester Av. Dis for Welding
BOSTON, MASS. Sharp Calks.

Crescent

Horse and Mule Shoes,

BAR IRON.

CRESCENT HORSE SHOE AND
IRON CO.

Max Meadows, Va.



FROST'S ANTI-RATTLER

Pat. Jan. 20, 1880.

Cut One-half Size.
Sample pair sent to any hardware or saddlery firm by addressing

The Frost Thill Spring Co.,

Boston, Mass.

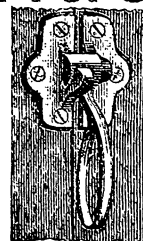
P. J. Conroy & Co.,

Paschall, PHILADELPHIA.

"CONROY"

Refrigerator Door

Fasteners



Have rapidly supplanted all others.

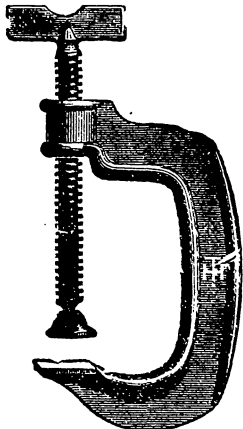
Refrigerator Trimmings.

Pat. Dec. 15 '85

BUFFALO SCALE CO., Buffalo, N. Y. SCALES OF ALL KINDS.

Patented Articles of MALLEABLE IRON.

NEW pattern Heavy Screw Clamps.
Strongest in the market.



HAMMER'S MALLEABLE IRON OILERS, 3 Sizes.

HAMMER'S MALL. IRON HAND LAMPS.

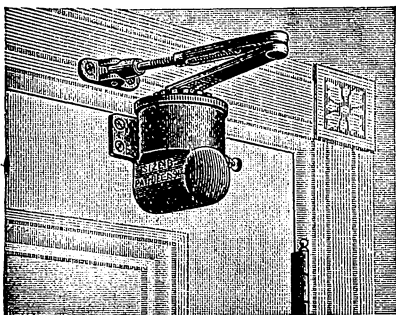
HAMMER'S M. I. HANGING LAMPS.

HAMMER'S ADJUSTABLE CLAMPS.

For sale by all the principal Hardware Dealers.
Send for Price List.

MALLEABLE IRON CASTINGS
of superior quality, and Hardware Specialties in
Malleable Iron made to order.

HAMMER & CO
Branford, Conn.



Bardsley's Liquid Door Check and Spring

Perfect in action, durable, neat in appearance, low
in price and fully warranted. Responsible Agents
wanted in the principal cities.

J. BARDSLEY, 149 & 151 Baxter St., New York.

HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for
Sash Cords, very strong and lasting (some in
daily use ten years), and gives thorough satis-
faction wherever used. The patented attach-
ments are very simple and can be applied to
any window.

MANUFACTURED ONLY BY

"THOMAS MORTON,"

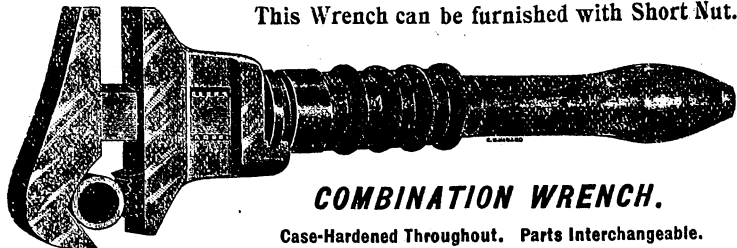
65 Elizabeth Street,

Write for Prices.

NEW YORK.

The Practical Polish and Varnish Maker.
By H. C. STANDAER. A treatise containing 750 re-
ceipts and formulae for the manufacture of var-
nishes, polishes, &c. 12mo, cloth.....\$2.50
For Sale by DAVID WILLIAMS, 96-102 Reade St., N.Y.

This Wrench can be furnished with Short Nut.



COMBINATION WRENCH.

Case-Hardened Throughout. Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the
requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.
For Circulars and Price-List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A.



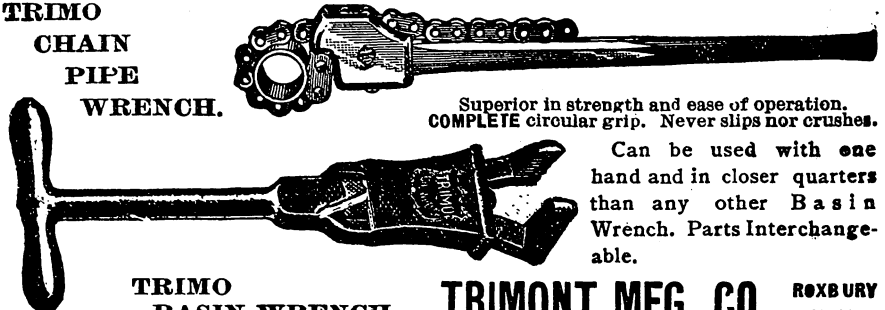
TRIMO PIPE WRENCH,

Forged Steel

All parts interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no
trouble in close quarters. Does not crush the pipe.

TRIMO CHAIN PIPE WRENCH.



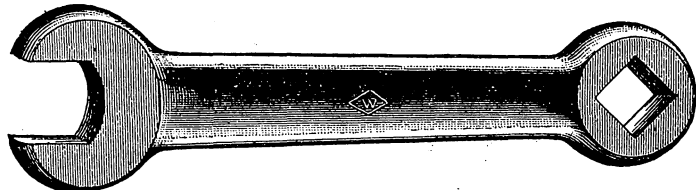
Superior in strength and ease of operation.
COMPLETE circular grip. Never slips nor crushes.

Can be used with one
hand and in closer quarters
than any other Basin
Wrench. Parts Interchange-
able.

**TRIMO
BASIN WRENCH.**

**TRIMONT MFG. CO., ROXBURY
MASS.**

STEEL DROP-FORGED DOUBLE HEAD TOOL POST WRENCHES. (FIVE SIZES.)

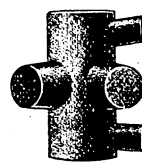
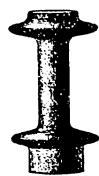
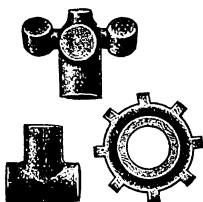


SEND FOR CATALOGUE TO

J. H. WILLIAMS & CO., 9-15 Richards St., - Brooklyn, N. Y.

MANUFACTURERS OF

Brock's Patent Chain Pipe Wrench and General Drop-Forgings.



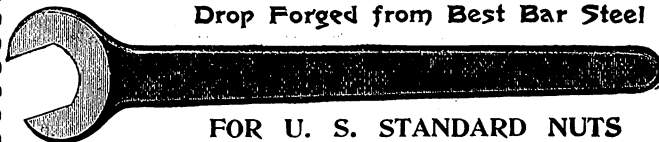
WYMAN & GORDON
WORCESTER, MASS.
DROP FORGINGS

STRAIGHT and
ANGLE END

MACHINE WRENCHES

Drop Forged from Best Bar Steel

SINGLE
OR
DOUBLE
END

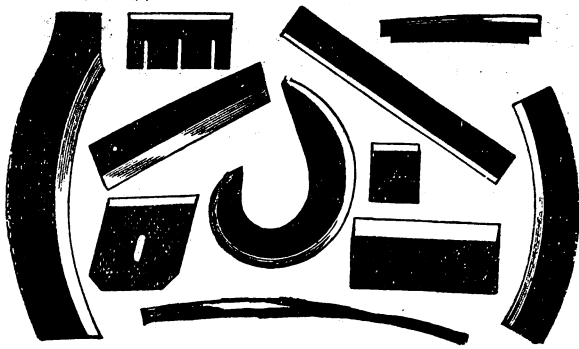


FOR U. S. STANDARD NUTS

Made with finished openings from 13-32 to 4 1-2 inches,
to take U. S. Standard Nuts 3-16 to 2 3-4 in. inclusive.

THE BILLINGS & SPENCER CO., Hartford, Ct.

Drop Forgings of Every Description

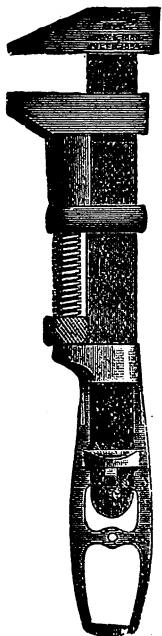
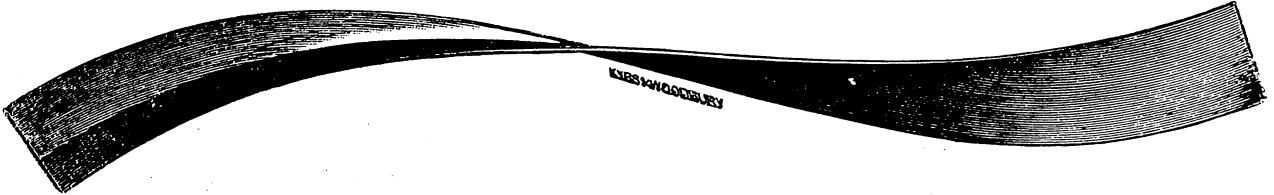
**LORING COES & CO.**

WORCESTER, MASS.

Manufacturers of MACHINE KNIVES.

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades Etc., showing how the Steel is laid.

**L. COES'**

Genuine Improved
KNIFE HANDLE
PATENT

Screw Wrenches

MANUFACTURED BY
COES WRENCH CO.,
WORCESTER, MASS.

Established in
1839.
Registered
March 31, 1874.

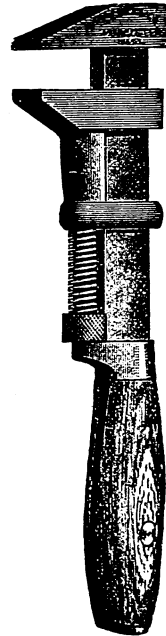
Patented July
6, 1880.
Patented July
8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

17" Straight Bar, Extra Long Nut for Screw in Jaw.

The BEST MADE and STRONGEST WRENCH in the MARKET.

J. C. McCARTY & CO., } New York Agents.
JOHN H. GRAHAM & CO., }



IMPROVED MINE LAMP
FOR ANTHRACITE AND BITUMINOUS MINING

6 DIFFERENT STYLES OF SPOUTS.

SAMPLE 15¢.

SEAMLESS BRASS COLLAR
BRASS HINGE
Lid Solid
No SOLDERING

B. E. LEONARD, Scranton, Pa.

RIVAL
Pat. Lawn Sprinkler
Cheapest and Best in Use.

The Spray from it covers upwards of 1,000 sq. feet of lawn. It is the only patent adjustable Sprinkler which is adaptable to any water pressure. Being made of brass, and having no revolving parts to wear out, or small openings to clog up, it can be operated with sandy or muddy water as well as clear, and will last for years. To operate, screw Sprinkler on end of hose, stick thereto in a vertical position, adjust the acorn to suit pressure and spray wanted and it is ready for use. It may be so regulated as to throw a spray as coarse as rain or as fine as mist, and will make one of the most beautiful fountains imaginable. It is unequalled in merit, requires no attention and is sold at a less price than any sprinkler in the market. Remember, the RIVAL is the only Sprinkler made by which the coarseness of the spray and the area to be wet can be regulated. They are packed 1 doz. in a box, and finished either plain or nickel plated.

The JOHN H. MCGOWAN CO.
Cincinnati, Ohio.

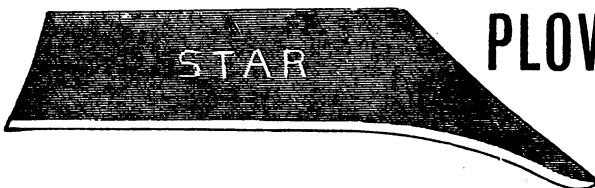
Agents Wanted. Liberal discount to buyers.

1/4" Inch Regular Hydrant Thread, (or Pipe Thread to order) per doz \$7.50
1" Inch. Reg. Gas Pipe Thread, 12.00
1 1/2" Sample Sprinkler sent prepaid on receipt of 60 cents.

STAR MANUFACTURING CO..

Carpentersville, Kane Co., Ill.

MANUFACTURERS OF

**PLOW SHARES.**

Plow Moldboards,
Landside Plates,
Landside Points.

Lister Shares, Fin Cutters, Cultivator Shovels, Cultivator Shovel Points, Plow Points, Screw Coulter Hubs.

Mention IRON AGE.

THE TOPLIFF & ELY CO.,
MAKERS.**BUCK "I" PRUNER**

ELYRIA, OHIO.

Every Pair Warranted.
Liberal Discount to Trade.

COLDWELL
LAWN MOWER CO.,
Newburgh, N. Y.

IMPERIAL

THE BEST MOWER MADE.
The Lightest Running Mower in the World.

This is the only Lawn Mower that stood the test of working the entire season on the Columbian Exposition Grounds without any repairs.

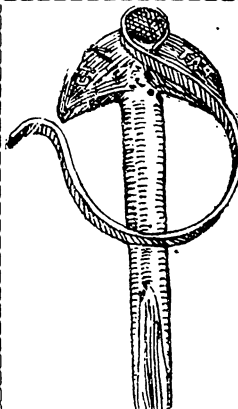
BARROWS.

Wood, Iron, Steel,
for Ore, Coal, Fur-
naces, Brickyards,
Stoneyards, Farm
and Garden Use.

The

Kilbourne & Jacobs Mfg. Co.,

COLUMBUS, O., U. S. A.



**THE BEST
OX-BOW
PIN**
In the World.

Sample sent
and prices given
on application.

Manufactured by
**O. C.
SAWYER,**
Sharon, Vermont.

THE SCIENTIFIC SWEEP MILL

FOR TWO HORSES.

Grinds EAR CORN and SMALL GRAINS.

Special Cob Breaking Device and peculiar dress
of Grinders. Gives BETTER WORK, MORE OF IT,
WITH LESS WORK TO TEAM than others. Send
for catalogue of this and

POWER MILLS.
THE FOOD MANUF'G. CO., SPRINGFIELD,
OHIO.

FULLY GUARANTEED.
SENT ON TRIAL.



EXPANSION BOLTS.



Manufacturers of Single and Double,
For fastening all kinds of Structure to Brick and Stone
Work. Catalogue furnished on application.
STEWART & ROMAINE MFG. CO., Philadelphia.



STEEL BARROWS.

LANSING WHEELBARROW CO.

LANSING, MICH.

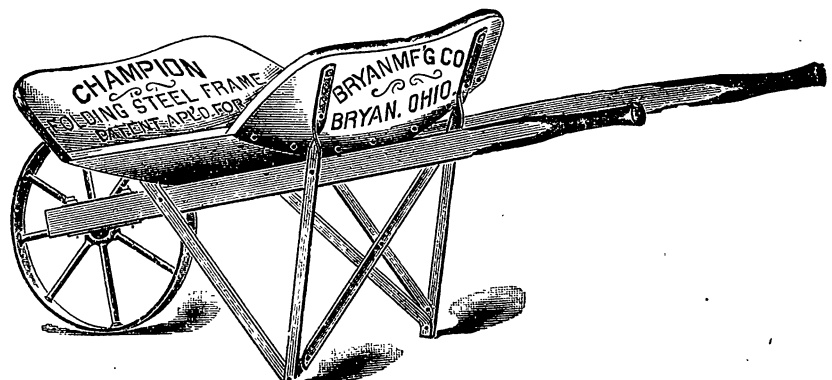
IT
IS
ALWAYS
CHEAPER

TO HANDLE THE BEST

The market affords than to try to sell cheap, trashy
productions. The "Champion Barrow" belongs
essentially in the former class and is offered to
dealers solely on its merits, while the cost is not
greater. For full particulars write

KNOCKED DOWN

Occupies Space
3 inches x 5 inches x 60 inches.



ALL STEEL WHEELBARROWS & SCRAPERS

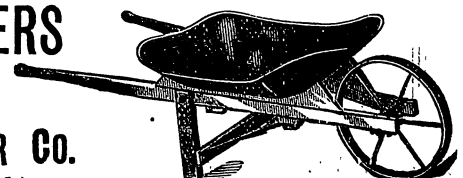
MANUFACTURED BY

AMERICAN STEEL SCRAPER CO.

104 Court Street, SIDNEY, O.

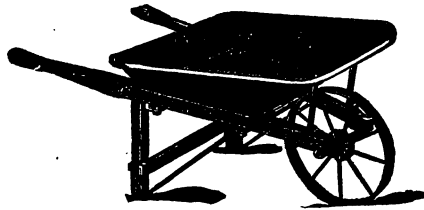


Write
for
Catalogue



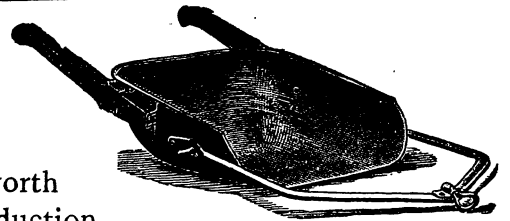
ONE MOMENT.

Have you bought your spring stock?

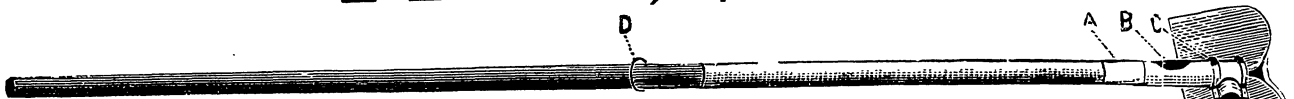


If not don't you think it worth while to investigate our production before doing so? We can and will make it interesting to you if you will write us.

Sidney Steel Scraper Co., 924 Poplar Street, SIDNEY, OHIO.



AYERS' COMBINED HAND PLANTER AND HOE. PRICE, \$2.00.



A. Ferrule which slides over and closes the opening B. B. The opening where the corn is introduced.
C. Malleable clamp and shank. D. Push-ring which works the seed slide. E. Nozzle where the corn is discharged.
The right edge of the hoe blade is allowed to strike the ground, which brings the nozzle down, the wire D is pressed and the corn is dropped from the nozzle E, an instant only being required for the operation.

This is a convenience everywhere, besides being the only planter adapted for hard, rough and rocky ground requiring a hoe in covering and in such cases it enables the workman to accomplish twice the usual service. For replanting and first hoeing it is especially adapted, as it is both a hoe and planter as required. As a hoe it is cheap at 50 cts., which leaves only \$1.50 as the additional cost for the planter, which is nothing in comparison to the convenience of always having a planter in hand supplied with seed during the operation of hoeing. With beans and peas it is even more accurate than with corn. There is hardly a farmer in the country who would not find it an economy to have one of these planters, however many other planters he may have or however good they may be. Agents wanted everywhere. Inducements liberal. Shipments f. o. b. New York or Petersburg, Va., as desired. Correspondence solicited.

J. R. AYERS, Patentee and Manufacturer, PETERSBURG, VA.

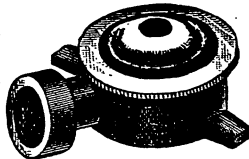


Japanese No. 12,
Adjust.

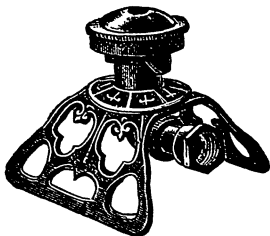
LAWN SPRINKLERS.

We manufacture the BEST and
CHEAPEST Lawn Sprinklers in
the World.

Chinese No. 8.



The only Sprinklers which have no revolving parts to leak or wear out.
The only Sprinklers free from small holes, and which cannot become clogged with gritty substances.
The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or as heavy as the area of the supply pipe.
The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with low pressures
We also manufacture the old style revolving sprinklers, but for our own use would not have them

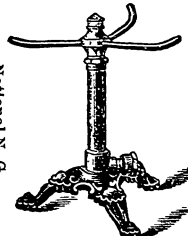


Lactua No. 6.

Ette & Henger Mfg. Co.

ST. LOUIS, MO.

National N. G.



SEND FOR DESCRIPTIVE CIRCULARS.

LITTLE GIANT

Traveling Lawn Sprinkler.

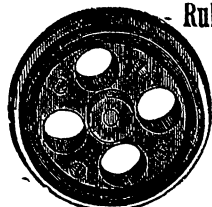
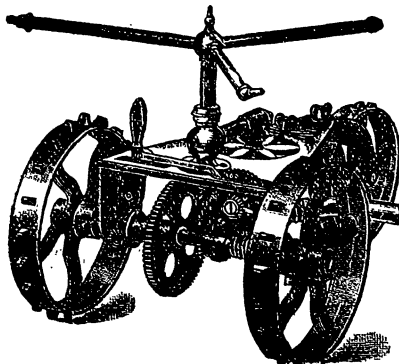
PATENTED.

Can be set to travel anywhere from 15 to 500 feet per hour, either on a straight line or in a circle, and can be gauged to throw water over a swath 5 to 50 feet in width.

Highest Award at World's Columbian Exhibition.

SEND FOR CIRCULAR.

PORTLAND LAWN SPRINKLER CO.,
PORTLAND, ME.



Rubber and Iron Wheels

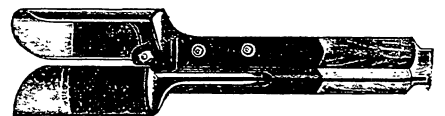
Castors for Trucks,
Baskets and Boxes
Heavy Castors for
Mill use.
Catalogues free.
G. P. CLARK, Box 0,
Windsor Locks, Conn.

Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL
MADE, FROM GOOD MATERIALS BY

A. J. Phillips & Co., Fenton, Mich.

THE PIONEER.

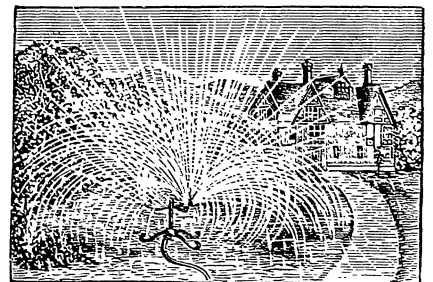


By all odds the BEST cheap Digger on the market. It is a great improvement over the ordinary Split-handle Diggers, as our Handles are stronger and easier to open; and the strain comes against the thick way of the handles, which any mechanic can see is the proper way to resist the strain. Split-handle Diggers made with the handles not folding, but opening out straight from each other are a dismal failure, as the strain comes against the broad thin part of the handles, causing them to spring, warp or break. BEAR THIS IN MIND when purchasing Post Hole Diggers, and thus save annoyance to both yourself and customers.

F. E. KOHLER & CO.,
CANTON, OHIO.

GENUINE

"CALIFORNIA" Lawn Sprinkler.



MANUFACTURED BY
BLAIR MANUFACTURING CO.
SPRINGFIELD, MASS.

Write for prices.

Also makers of the most complete line of Lawn Mowers on the market.

Why Band Saws Break. Sixteen reasons and how to avoid them. Being instructions to filers on the care of large band-saw blades used in the manufacture of lumber. By JOSHUA OLDHAM, 90 pages, illustrated, cloth.....\$1.00
For Sale by David Williams, 96-102 Reade St., N.Y.

The Synonym for Perfection in

Lawn Mowers is "PENNSYLVANIA."

Please Read following:—

HOW DO THEY WEAR?

"A single straw shows which way the wind blows."

"I have used this Pennsylvania Machine nearly 15 years and only paid out 5 cents on it, and to-day does as good work as it ever did."

(Signed),

L. OSBORN,

Jan. 17, 1894.

Greenville, Mich.

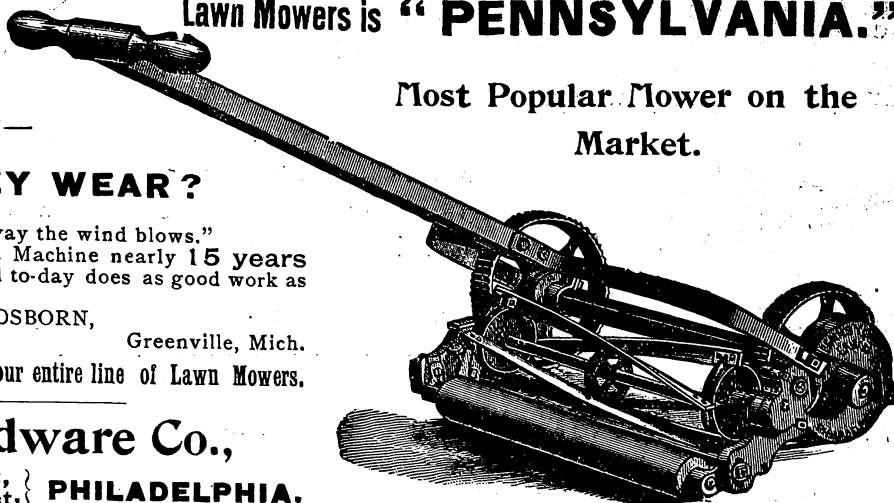
Highest Award at World's Fair on our entire line of Lawn Mowers.

Supplee Hardware Co.,

503 Market Street,
4 & 6 N. Fifth Street,

PHILADELPHIA.

Most Popular Mower on the Market.



McGuire's ♦ Diamond.

MANUFACTURED BY

Dille & McGuire Mfg. Co.,
RICHMOND, IND., U. S. A.

PRICE-LIST.

Wheels, 8 Inches High. Cutter, 5½ Inches Diameter.

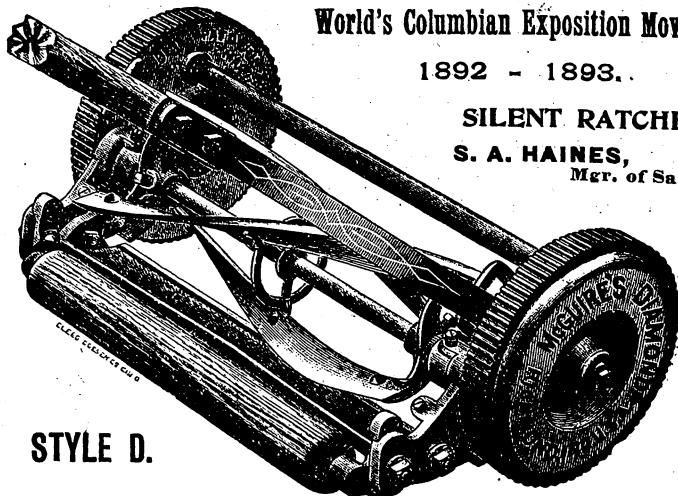
LENGTH.	LIST.	Discount to the
10 Inch	\$13.00	Trade,
12 "	14.00	70 per cent.,
14 "	15.00	F.O.B. Factory.
16 "	16.00	
18 "	17.00	

PHOSPHOR BRONZE JOURNAL BEARINGS. BEST QUALITY STEEL.

This is the Mower contracted for by the Chief of Construction at the Columbian Exposition; was used on the lawns at the World's Fair grounds during the preparatory season of 1892, and being approved by the Landscape Architects, was adopted exclusively for 1893.

If you wish a first-class Mower in all respects, one that is fully warranted,

—BUY MCGUIRE'S DIAMOND.—



STYLE D.

—OFFICIAL—
World's Columbian Exposition Mower.

1892 - 1893.

SILENT RATCHET.

S. A. HAINES,
Mgr. of Sales.

Chadborn & Coldwell
Mfg. Co.,

NEWBURGH, N. Y.,

—Sole Manufacturers of—



New Model
AND
Excelsior
LAWN
MOWERS
ALSO
The Rival,
The O K,
Etc., Etc.

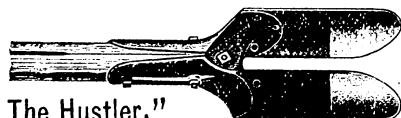
Send for Illustrated Catalogue.

"The Hustler."



By buying the Hustler Lawn Rakes you have the cheapest and best made. All leading jobbers handle them.

Our line of Post Hole Diggers comprises 5 of the Best Known Styles on the market. Prices low.



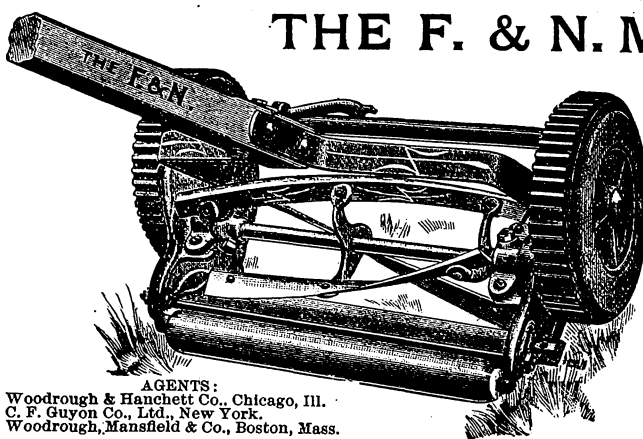
"The Hustler."

GIBBS MFG. CO, Canton, Ohio.

THE F. & N. MFG. CO.,

Manufacturers of
Lawn Mowers
and
Grass Catchers,
RICHMOND, IND., U. S. A.

THE
F. & N.
LAWN
MOWER
" '94."



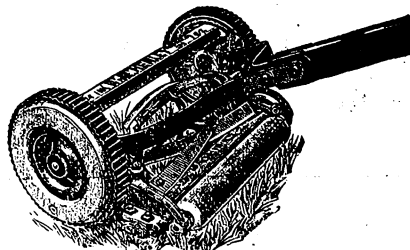
AGENTS:
Woodrough & Hanchett Co., Chicago, Ill.
C. F. Guyon Co., Ltd., New York.
Woodrough, Mansfield & Co., Boston, Mass.

Solid Steel Cutter Bar. Reel
Knives adjusted to Cutter
Bar. Phosphor Bronze Reel
Bearings.

HENLEY'S MOWERS

For Lawns and Parks

Are first class, high grade machines, made of the best materials, neat, symmetrical, strong and unexcelled in construction and ease of operation. Does perfect work. For prices, address



M. C. HENLEY, Sole Mfr., Richmond, Ind., U. S. A.

EASTERN REPRESENTATIVES: H. S. Earle, 110 and 112 N. Warren St., Syracuse, N. Y.; Wm. H. Cole & Sons, 13 S. Charles St., Baltimore, Md.; Carpenter & Bayles, 91 Chambers St., New York City.



WROUGHT WASHERS

Every Washer
FLAT
With hole in
TRUE CENTER.



Packed in kegs for general trade, or in 1 and 5 lb. boxes for hardware trade.

MACHINE BOLTS.



HOT PRESSED NUTS.

Highest
Standard of
EXCELLENCE.

It will pay you to correspond with us.

THE MILTON MNFG. CO.,

MILTON, PA.

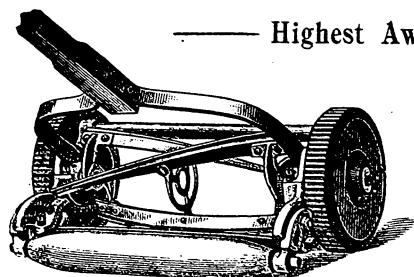
Pennsylvania Bolt & Nut Co.
Lebanon Pa.

MANUFACTURERS OF

REFINED BAR-IRON · MACHINE-BOLTS · TRACK-BOLTS · & BOLT-ENDS ·
LAG-SCREWS · GIMLET-POINTED COACH-SCREWS · HOT PRESSED & COLD PUNCHED SQUARE & HEXAGON NUTS ·
CHAMFERED & TRIMMED NUTS · WROUGHT & CAST WASHERS · TURN-BUCKLES ·
STRUCTURAL & ELECTRICAL FORGINGS · BOILER & BRIDGE RIVETS · CAR FORGINGS & ARCH-BARS

Genuine Philadelphia Lawn Mowers.

Highest Award at the Field trial, World's Fair, Chicago, 1893.



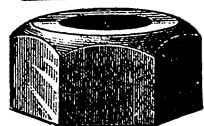
375,000 Machines Sold.

Hand, Pony and Horse Machines, Traveling Lawn
Sprinkler, Lawn Sweeper and Collectors.

ACKNOWLEDGED STANDARD OF EXCELLENCE FOR 22 YEARS.

SEND FOR PRICE-LIST AND DISCOUNTS.

THE PHILADELPHIA LAWN MOWER CO., { Successors to Graham, Passmore & Co., } 3107 & 3109 Chestnut St., Philadelphia, Pa.



PORTCHESTER BOLT & NUT CO.

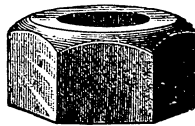
Port Chester, N. Y.

MANUFACTURERS OF

BOLTS, NUTS, RIVETS and WASHERS

CHAMFERED AND TRIMMED.

SQUARE AND HEXAGON NUTS A SPECIALTY.

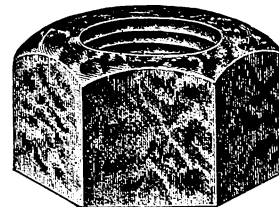


DUNHAM NUT CO.,

UNIONVILLE, CONN.,

Manufacturers of

All Grades
of
Finished
Nuts
and



Automatic Cold Press Nut Machines.

SEND FOR CATALOGUE.

BOLTS,

Machine, Car,
Track, Pipe, Loom.

Cold Punched

NUTS,

AMERICAN BOLT COMPANY, Lowell, Mass.

THOMAS CLARKE
HARDWARE AND GENERAL AGENT.

(FIRST-CLASS REFERENCES.)

60 PRINCE WILLIAM ST., ST. JOHN,
NEW BRUNSWICK.

Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL
MADE, FROM GOOD MATERIALS BY

A. J. Phillips & Co., Fenton, Mich.



INTERCHANGEABLE
LOCK-CORNER SHELF BOXES,
Screw Cases, &c.,
FOR THE HARDWARE TRADE.
A. H. GREEN,
22 Park Place, New York.

WM. H. HASKELL, PRESIDENT.

E. S. MASON, TREASURER.

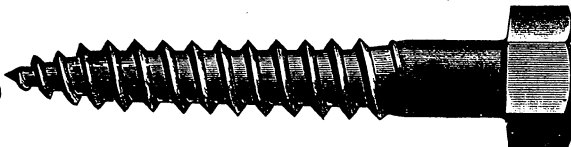
D. A. HUNT, AGENT.



GIMLET POINT
COACH SCREWS

WM. H. HASKELL CO.,

—MANUFACTURERS OF—



Bolts, Cold-Punched
Nuts and Washers,
SUITABLE FOR MACHINERY
OF ALL KINDS.



Office and Works: 451 Main St., PAWTUCKET, R. I., U. S. A.

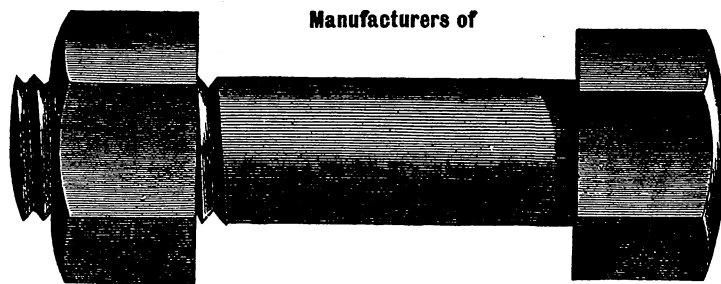
HENRY B. NEWHALL CO., Agents,

105 CHAMBERS STREET, NEW YORK.

- 47 PEARL STREET, BOSTON.

WORCESTER MACHINE SCREW CO., Worcester, Mass.

SET,
CAP AND
MACHINE
SCREWS.



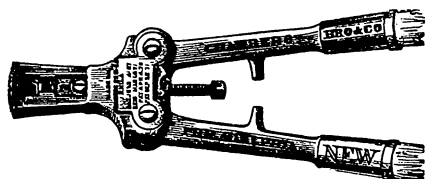
Manufacturers of

STUDS FOR
STEAM
ENGINE,
PUMPS, &c.

EXPANSION BOLTS.



For Fastening all Kinds of Structure to
Brick and Stone Work.
Patentee and M'r, ISAAC CHURCH,
Toledo, O.



BOLT & RIVET CLIPPERS,

For cutting off the ends of Bolts and Rivets.
Liberal discounts to the trade.

CHAMBERS BROTHERS COMPANY

52d St., BELOW LANCASTER AVE.,
PHILADELPHIA, PA.

WM. H. JACOBUS

No. 90 Chambers St., New York.

New York Office of

- J. F. Wollensak.
Barnes Mfg. Co.
N. R. Streeter & Co.
Geo. W. Nock.
Tuck Mfg. Co.
Menis Vegetable Press.
Dille & McGuire Mfg. Co.
Bommer Bros.
Palmer Hdw. Mfg. Co.
Wire Goods Co.
National Rivet Works.
Wolcott Hdw. Co.
Fibre Head Mallet.
Burnside Cedar Faucets.
Cleveland Window Shade Co.
Zimmerman's Blind Adjusters.
Garritt & Beach.
Wilcox Mfg. Co.
M. B. Schenck & Co.
Hemacite Mfg. Co.
Franklin Mfg. Co.
Atlas Mfg. Co.
National Specialty Mfg. Co., Ltd.



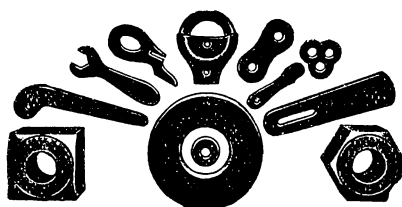
ESTABLISHED 1865.

J. H. Sternbergh & Son,

READING PA.

BOLTS, NUTS, WASHERS, RIVETS,

Including Machine Bolts, Carriage Bolts, Bridge Bolts and Car Bolts,
THE HARVEY PATENT GRIP-THREAD TRACK BOLT, Soft Steel Bolts with Cold Rolled
Thread, Bolt Ends, Turnbuckles, Sleeve Nuts, Lag Screws, Set Screws and Tap Bolts and every variety of
screwed work,
BOILER, BRIDGE AND SHIP RIVETS, Square and Hexagon Nuts of all kinds and sizes, Plate
Washers, Belt Lacing Machines, Rods and Irons for Bridges and Buildings, Merchant Bar Iron, etc., etc.
Branch Establishment, THE KANSAS CITY BOLT & NUT CO., Kansas City, Mo.



J. FRED WILSON, Worcester, Mass.

Metal Punching AND Die Work.

Cold Punched Nuts and Washers
for all Purposes.

SEND FOR PRICES ON
SPECIALTIES IN LINE OF PRESS WORK.

CLASSIFIED LIST OF ADVERTISERS.

- Agricultural Implements.**
Ayers, J. R., Petersburg, Va.
Sickles, Sweet & Lyon, 35 Barclay St., N. Y.
- Air Compressors.**
Norwalk Iron Works, S. Norwalk.
Rand Drill Co., 23 Park Place, N. Y.
- Air Moving Machinery.**
Howard & Morse, 45 Fulton, N. Y.
- Aluminum.**
Illinois Pure Aluminum Co., Lemont Ill.
Pittsburgh Reduction Co., Pittsburgh.
Scovill Mfg. Co., Waterbury, Conn.
- Aluminum, Brass and Bronze.**
Gaylord, F. L. Co., Ansonia, Conn.
Haight & Clark, Albany, N. Y.
Fratt & Cady Co., Hartford, Conn.
St. Louis Bronze & Aluminum Works, St. Louis, Mo.
- Aluminum Folder.**
Alsie Aluminum Co., 106 Liberty St., N. Y.
- Analytical Chemists.**
Criston, J. H., 221 Pearl St., N. Y.
Moore, Dr. Gideon E., 221 Pearl St., N. Y.
- Anti-Friction Metals.—See Babbitt Metal.**
- Anvils.**
Eagle Anvil Works, Trenton, N. J.
- Anvil and Vise (Combination).**
Fulton Iron & Engine Works, Detroit, Mich.
- Apple Parers.**
Goodell Co., Antrim, N. H.
- Arms and Ammunition.**
Hartley & Graham, 313 & 315 Broadway, New York.
Ideal Mfg. Co., New Haven, Conn.
Stevens, J., Arms and Tool Co., Chicopee Falls, Mass.
Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.
- Auctioneers.**
Bissell, E. Son & Co., N. Y.
- Axes.**
Feck, A. G. & Co., Cohoes, N. Y.
- Axles, Springs, &c., Manufacturers of.**
Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.
Wurster, F. W. & Co., Brooklyn, N. Y.
- Babbitt Metal.**
Crown Smelting Co., Chester, Pa.
Hertz, T. & Son, St. Louis, Mo.
Keys, W. W. & R. M. Co., Bridgeport, Conn.
Reeves, Paul S., Philadelphia, Pa.
- Bakers and Roasters.**
Bronson Supply Co., Cleveland, Ohio.
- Bale Ties.**
Kilmer Mfg. Co., Newburg, N. Y.
- Barb Wire and Fence.**
Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Washburn & Moen Mfg. Co., Worcester.
- Bar Iron, Manufacturers of.**
Acana-Standard Iron & Steel Co., Bridgeport, Conn.
Allentown Rolling Mill, Allentown, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Montour Iron & Steel Co., Danville, Pa.
Mahoning Valley Iron Co., Youngstown, Ohio.
Sternberg, J. R. & Son, Reading, Pa.
- Bellows, Manufacturers of.**
Scott, Geo. M., Chicago, Ill.
- Bells.**
Sevin Bros. Mfg. Co., East Hampton.
- Belt Dressing.**
Jos. Dixon Orville Co., Jersey City, N. J.
- Belt Fasteners.**
Aristot Co., Waterbury, Conn.
Claden Mfg. Co., Cleveland, Ohio.
Talcott, W. O., Providence, R. I.
- Belting, Makers of.**
Alexander Bros., 413 N. 3d., Phila.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Engineering Co., Phila., Pa.
Main Belting Co., Philadelphia, Pa.
N. Y. Belting & Packing Co., Ltd., N. Y.
Roberts Mfg. Co., Pittsburgh, Pa.
Shultz Belting Co., St. Louis, Mo.
Stanley Works, New Britain, Conn.
- Bending Rolls.**
Wickes Bros., Saginaw, Mich.
- Bicycle Locks.**
Dieffenbacher, W. H. & Co., Chicago, Ill.
- Bicycles and Bicycle Sundries.**
Bevin Bros. Mfg. Co., E. Hampton, Mass.
Bridgeport Gun Implement Co., 313-315 Broadway, New York.
Bronson Supply Co., Cleveland, O.
Crawford Mfg. Co., Hagerstown, Md.
Dieffenbacher, W. H. & Co., Chicago, Ill.
Eagle Bicycle Mfg. Co., Torrington, Ct.
Grand Rapids Cycle Co., Grand Rapids, Mich.
- Bikes, Tackles, Makers of.**
Cleveland Hook Co., Cleveland, O.
Fulton Iron & Engine Works, Detroit, Mich.
- Blowers.**
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Sturtevant, B. F. & Co., Boston, Mass.
- Boiler Plates.**
Carbon Steel Co., Pittsburgh, Pa.
Mollvain, Wm. & Sons, Reading, Pa.
Lukens Iron & Steel Co., Coatsville, O.
Pottstown Iron Co., Pottstown, Pa.
- Boilers, Copper.**
Randolph & Clowes, Waterbury, Conn.
- Boilers, Steam.**
Sawcock & Wilcox Co., 30 Cortlandt, Harrison Safety Boiler Wks., Phila., Pa.
Polack, W. B. & Co., Youngstown, O.
Southwark Fdy. & Mch. Co., Phila., Pa.
Sterling Co., Chicago, Ill.
Wetherill, Robt. & Co., Chester, Pa.
- Bolt Cutters.**
Chambers Bros. Co., Philadelphia.
Howard Iron Works, Buffalo, N. Y.
Reece, Edw. F., Greenfield, Mass.
Wells Bros. Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Books.**
Williams, David, 96-102 Reade, N. Y.
Wilcoff & West, Syracuse, N. Y.
- Boring Machines.**
Buckeye Mfg. Co., Union City, Ind.
- Box Straps and Corners.**
Cary Mfg. Co., 5 to 9 Elm St., N. Y.
- Boxes, Hdw. Shelf, &c.**
Jones, Jesse & Co., Philadelphia, Pa.
- Brass, Manufacturers of.**
Ansonia Brass & Copper Co., N. Y.
Daryl, John & Sons, 100 John, N. Y.
Finn & Wood Mfg. Co., N. Y.
Randolph & Clowes, Waterbury, Conn.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Waterbury Brass Co., 296 B'way, N. Y.
- Brass Butt Hinges.**
Tiebout, W. & J., 16 & 18 Chambers.
- Brass Founders.**
Best, Fox & Co., Pittsburgh, Pa.
Cramp, Wm. & Sons, 3 & E. B. Co., Philadelphia, Pa.
Eaton-Evans Mfg. Co., Philadelphia, Pa.
Fralin, E. T., Lancaster, Pa.
Haight & Clark, Albany, N. Y.
Keys, W. W. & R. M. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Phila., Pa.
Reeves, Paul S., Philadelphia.
- Brass Goods.**
Brass Goods Mfg. Co., 88 Chambers.
- Bridge Builders.**
Berlin Iron Bridge Co., East Berlin, Ct.
- Bronze (Tobin).**
Ansonia Brass & Copper Co., 19-26 Cliff Street, N. Y.
- Brooms and Brushes.**
Bromwell Brush & Wire Goods Co., Cincinnati, Ohio.
- Builders' Hardware.**
Corbin, P. & F., New Britain, Conn.
Deltz, A. E., 97 Chambers St., N. Y.
Reading Hdw. Co., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.
- Butchers' Steels.**
Chastillon, John & Sons, 85-89 Cliff St., N. Y.
Hoffman, C. & A., Philadelphia, Pa.
- Butcher and Shoe Knives, Manufacturers of.**
Chastillon, John & Sons, 85-89 Cliff St., N. Y.
Goodell Co., Antrim, N. H.
Wilson, John, Sheffield, England.
- Butts and Hinges.**
McKinney Mfg. Co., Allegheny, Pa.
Sabin Machine Co., Montpelier, Vt.
Stanley Works, New Britain, Conn.
Tiebout, W. & J., 16 Chambers, N. Y.
- Calipers and Dividers.**
Hoggson & Pettis Mfg. Co., New Haven, Conn.
J. Stevens Arms and Tool Co., Chicopee Falls, Mass.
Starrett, L. S., Athol, Mass.
- Car Axles.**
Roberts, A. & P. & Co., Phila.
- Carboy Stands.**
Hillebrand & Wolf, Philadelphia, Pa.
- Carriage Hardware, Makers of.**
Cover's Saddlery Works, Farmer, N. Y.
Eccles, Richard, Auburn, N. Y.
McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.
Scranton Forging Co., Scranton, Pa.
Smith, H. D. & Co., Plantville, Conn.
Wilcox & Howe Co., Birmingham, Conn.
- Cartridge Reloading Tools.**
Ideal Mfg. Co., New Haven, Conn.
- Carvers' Tools.**
White, Van G्लाhn & Co., 15-17 Chatham Square, N. Y.
- Casters, Wheel, &c.**
Clark, G. P., Windsor Locks, Conn.
- Castings Cleaning Apparatus.**
Tilghmans Patent Sand Blast Co., Ltd., Sheffield, England.
- Castings, Iron and Steel.**
Booth, The Lloyd Co., Youngstown, O.
The Burr & Houston Co., Brooklyn, N. Y.
Cheney, S. & Son, Manlius, N. Y.
Chester Steel Casting Co., Phila.
Chrome Steel Works, Brooklyn, N. Y.
Eureka Cast Steel Co., Chester, Pa.
Flagg, Stanley G. & Co., Phila.
Garland Foundry Co., Cleveland, O.
Haight & Clark, Albany, N. Y.
King & Andrews Co., Chicago, Ill.
Pamers & De Mooy, Cleveland, O.
Pratt & Cady Co., Hartford, Conn.
Sessions Foundry Co., Bristol, Conn.
Spencer's I. S. Sons, Guilford, Conn.
Standard Fdy. & Mfg. Co., Cleveland, O.
Western Fdy. Co., Chicago, Ill.
Wetherill, Robt. & Co., Chester, Pa.
- Castings, Malleable.**
Arcade Malleable Iron Co., Worcester, Mass.
Dayton Malleable Iron Co., Dayton, O.
Hammer & Co., Branford, Conn.
- Chains.**
Bradlee & Co., Philadelphia.
Kelley & McBean, Niagara Falls, N. Y.
Link-Belt Engineering Co., Phila., Pa.
McKay, Jas. & Co., Pittsburgh, Pa.
- Chain Links.**
Phila. Drop Forging Co., Phila., Pa.
- Chimneys.**
Phila. Engineering Works, Phila., Pa.
- Chisels, Manufacturers of.**
Snack Bros., Millbury, Mass.
Buck, Chas., Millbury, Mass.
White, L. & I. J. Co., Buffalo, N. Y.
- Chucks.**
Chusman Chuck Co., Hartford, Conn.
Hoggson & Pettis Mfg. Co., New Haven, Conn.
Smith & Egge Mfg. Co., Bridgeport, Conn.
Union Mfg. Co., 103 Chambers, N. Y.
Whitton, D. E. Mach. Co., New London, Conn.
- Clamps.**
Hammer & Co., Branford, Conn.
Le Count, C. W., So. Norwalk, Conn.
- Coal.**
Barns, C. K. & Co., Philadelphia, Pa.
Wister, Francis, Philadelphia, Pa.
- Coke.**
Barns, C. K. & Co., Philadelphia, Pa.
Houston, C. B. & Co., Philadelphia, Pa.
Rainey, W. J., Cleveland, O.
Wister, Francis, Philadelphia, Pa.
- Collections.**
Hardware Board of Trade (Limited) 4 and 6 Warren, N. Y.
- Condensers.**
Worthington, Henry R., 86 & 88 Liberty Street, N. Y.
- Conveying Machinery.**
Brown Hoisting & Conveying Machine Co., Cleveland, Ohio.
Jeffrey Mfg. Co., Columbus, O.
Link Belt Engineering Co., Phila., Pa.
- Copper.**
Ames Sword Co., Chicopee, Mass.
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
New Haven Copper Co., 294 Pearl, N. Y.
Randolph & Clowes, Waterbury, Conn.
Rome Brass & Copper Co., Rome, N. Y.
Wister, Francis, Philadelphia, Pa.
- Cordage.**
Samson Cordage Works, Boston, Mass.
- Cork Screws.**
Williamson, C. T. Wire Novelty Co., Newark, N. J.
- Corrugated Furnaces.**
Continental Iron Wks., Brooklyn, N. Y.
- Corrugated Iron.**
Cincinnati Corrugating Co., Piqua, O.
Cambridge Roofing Co., Cambridge, Mass.
Moseley Iron Bridge & Roof Co., 5 Day, N. Y.
Iron Roofing & Corrugating Co., Jersey City, N. J.
- Counting Machines.**
Durant, W. N., Milwaukee, Wis.
- Coverings, Boiler and Pipe.**
Johns, H. W. Mfg. Co., 37 Maiden Lane.
- Cranes.**
Detroit Foundry Equipment Co., Detroit, Mich.
Halsey, W. S. & Co., Birdsboro, Pa.
Harrington, E. Son & Co., Phila., Pa.
Maris & Beekley, Philadelphia, Pa.
Ridgway, Craig & Sons, Coatesville, Pa.
Sellers, Wm. & Co., Inc., Phila., Pa.
Yale & Towne Mfg. Co., Stamford, Conn.
- Cupolas, Hot Blast.**
Byram & Co., Detroit, Mich.
Detroit Fdry. Equipment Co., Detroit, Mich.
- Curry Combs.**
Gibbs Mfg. Co., Canton, O.
- Cutlery Cases.**
Torrey, J. R. & Co., Worcester, Mass.
- Cutlery Enamel.**
Shipley, A. B. & Son, Phila., Pa.
- Cutlery, Importers of.**
Gurney, Fred B., 116 Chambers St., N. Y.
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
- Cutlery, Manufacturers of.**
ingham, W. Co., Cleveland, Ohio.
Dane, Stoddard & Kendall, Boston, Mass.
Goodell Co., Antrim, N. H.
Northampton Cutlery Co., Northampton, Mass.
Wilson, John, Sheffield, England.
- Cyclometers.**
Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.
- Dashes and Fenders.**
McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.
- Dies.**
Wilson, J. Fred, Worcester, Mass.
- Die Forgings and Castings.**
Bliss, E. W. Co., Brooklyn, N. Y.
- Dog Collars.**
Kelley & McBean, Niagara Falls, N. Y.
Union Hardware Co., Torrington, Ct.
- Door Checks and Springs.**
Bardsley, J., 149 & 151 Baxter St., N. Y.
Corbin, P. & F., New Britain, Conn.
- Door Knobs.**
Perry & Whipple Co., New Haven, Ct.
- Drain Cleaners.**
Buckeye Mfg. Co., Union City, Ind.
- Drilling Machines.**
Bickford Drill & Tool Co., Cinn., Ohio.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower and Forge Co., Lancaster, Pa.
Colburn, A. M., New Haven, Conn.
Dallett, Thos. H. & Co., Philadelphia, Pa.
Dietz, Schumacher & Co., Cincinnati, Ohio.
Dwight Slate Machine Co., Hartford, Conn.
Goddard, Asa, Worcester, Mass.
Halsey, Jas. T., Philadelphia, Pa.
Hamilton Mch. Tool Co., Hamilton, O.
Norton & Jones Machine Tool Works, Plainville, Conn.
Penn. Diamond Drill & Mfg. Co., Birdsboro, Pa.
Quint, A. D., Hartford, Conn.
Sellers, Wm. & Co., Inc., Phila., Pa.
Sigourney Tool Co., Hartford, Conn.
Silver Mfg. Co., Salem, O.
- Drop Forgings.**
Billings & Spencer Co., Hartford, Conn.
Boone, W. C. Mfg. Co., Boonton, N. J.
Eccles, Richard, Auburn, N. Y.
Kerrill Bros., Brooklyn, N. Y.
Miner & Peck Mfg. Co., New Haven, Ct.
Phila. Drop Forge Co., Philadelphia, Pa.
Scranton Forging Co., Scranton, Pa.
Williams, J. H. & Co., Brooklyn, N. Y.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
Wyman & Gordon, Worcester, Mass.
- Drop Presses.**
Bliss, E. W. Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Miner & Peck Mfg. Co., New Haven, Conn.
Stiles & Parker Press Co., Brooklyn, N. Y.
Vulcan Iron Works, Chicago, Ill.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
- Dumb Waiters.**
Storm Mfg. Co., Newark, N. J.
- Dust Beaters.**
Peabody & Parks, Troy, N. Y.
- Dynamite.**
New York Powder Co., 62 Liberty St., N. Y.
- Dynamos.**
C. & C. Electric Co., 402 and 404 Greenwich St., N. Y.
- Edge Tools, Makers of.**
Buck Bros., Millbury, Mass.
Buck, Chas., Millbury, Mass.
Plumb, Fayette R., Philadelphia, Pa.
White, L. & I. J. Co., Buffalo, N. Y.
- Edging Shears.**
Dille & McGuire Mfg. Co., Richmond Ind.

- Egg Beaters.**
North Bros. Mfg. Co., Philadelphia.
- Electric Bells and Supplies.**
Gussard, W. A. & Co., 204 Fulton St. New York.
- Electric Dynamo Machines.**
Sady Electric Mfg. Co., Windsor, Conn.
- Elevators, Makers of.**
Link-Belt Engineering Co., Phila., Pa.
Morris, Williams & Co., Phila., Pa.
- Emery and Emery Wheels.**
N. Y. Setting & Packing Co., Ltd., N. Y.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.
Sturtevant Mill Co., Boston, Mass.
- Emery Wheel Dressers.**
Bay State Stamping Co., Worcester, Mass.
- Enamels.**
Enubian Iron Enamel Co., Cragin, Ill.
- Engineers and Contractors.**
Alken Henry, Pittsburgh, Pa.
Artificial Gas Engineering Co., Pittsburgh, Pa.
Herrick, J. A., 284 Pearl St., N. Y.
Kennedy, Julian, Pittsburgh, Pa.
Laughlin, Alex. & Co., Pittsburgh, Pa.
Lean, D. B., Co., Pittsburgh, Pa.
McCleure, Amster & Co., Pittsburgh, Pa.
Pittsburgh Iron Steel Engineering Co., Pittsburgh, Pa.
Smythe, S. H. Co., Incorporated Pittsburgh, Pa.
Swindell, W. & Bros., Pittsburgh, Pa.
- Engines, Gas.**
Otto Gas Engine Works, Phila., Pa.
Rollason Gas Engine, Havemayer Bldg N. Y.
- Engines, Steam, Makers of.**
Bass Foundry & Machine Works, Ft. Wayne, Ind.
Erie Engine Works, Erie, Pa.
Norwalk Iron Works Co., So. Norwalk, Conn.
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
Phila. Engineering Works, Phila., Pa.
Southward Foundry and Machine Co., Phila., Pa.
Tod, William & Co., Youngstown, O.
Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.
Wetherill, Robt. & Co., Chester, Pa.
- Exhaust Tumblers.**
Sweeter, W. A., Brockton, Mass.
- Expansion Bolts.**
Boone, W. C. Mfg. Co., Boonton, N. J.
Church, Isaac, Toledo, O.
Steward & Romaine Mfg. Co., Phila., Pa.
- Faucets, Self-Measuring.**
Lane Bros., Poughkeepsie, N. Y.
- Faucets, Wooden, Makers of.**
John Sommer's Son, Newark, N. J.
- Feed-Water Heaters.**
Davis, I. H. & Son, Hartford, Conn.
Goubert Mfg. Co., 32 Cortlandt St., N. Y.
Harrison Safety Boiler Wks. Phila., Pa.
National Pipe Bending Co., New Haven, Conn.
Taunton Locomotive Mfg. Co., Taunton, Mass.
Webster, Warren & Co., Camden, N. J.
Whitlock Coil Pipe Co., Elmwood, Conn.
- Fencing, Iron and Wire.**
Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Cleveland Fence Co., Indianapolis, Ind.
Clinton Wire Cloth Co., Clinton, Mass.
Gilbert & Bennett Mfg. Co., 42 Cliff St., Mass.
Kilmer Mfg. Co., Newburgh, N. Y.
Maat, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- File Cards.**
Frasse Co., 19 Warren St., N. Y.
- Files, Importers of.**
Moss, F. W., 80 John St., N. Y.
- Files and Rasps, Manufacturers of.**
Arcade File Works, Anderson, Ind.
Banker & White, Troy, N. Y.
Barnett, G. & H., 41 & 43 Richmond Phila.
McCaffrey File Co., Philadelphia.
Nicholson File Co., Providence R. I.
- Fire Brick, Makers of.**
Borgner, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Kreischer B. & Son, Foot E. Houston, St.
McLeod & Henry Co., Troy, N. Y.
Maurer, H. & Son, 420 E. 23d, N. Y.
Ostrand Fire Brick Co., Troy, N. Y.
Solomon, Jno. M., Wilmington, Del.
Valentine, M. D. & Bro., Woodbridge.
- Fishing Tackle.**
Dane, Stoddard & Kendall, Boston, Mass.
- Flint.**
Crystal Mills Co., Chester, Mass.
- Flint and Emery Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Fly Traps.**
Bromwell Brush & Wire Goods Co., Cincinnati, Ohio.
- Flue Cleaners.**
Mackey, Jas. T., St. Louis, Mo.
- Fodder Cutters.**
Silver Mfg. Co., Salem, O.
- Forges, Portable, &c.**
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Foss Mfg. Co., Springfield, Ohio.
Sturtevant, E. F. Co., Boston, Mass.
- Forgings, Iron and Steel.**
Lehigh Iron Co., S. Bethlehem, Pa.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Frankford Steel Co., Phila., Pa.
Scranton Forging Co., Scranton, Pa.
U. S. Projectile Co., Brooklyn, N. Y.
- Foundry Facings.**
Dixon, Jos., Crucible Co., Jersey City, N. J.
O. Oermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cincinnati, O.
Solomon, Jno. M., Wilmington, Del.
- Foundry Riddles.**
Lacey, W. B. 65 Fulton, N. Y.
- Foundry Supplies.**
Diamond Clamp & Flask Co., Richmond, Ind.
O. Oermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cincinnati, O.
- Friction Clutches.**
Keystone Clutch & Mch. Wks., Phila., Pa.
Moore & White Co., Philadelphia, Pa.
- Friction Cone.**
Evans Friction Cone Co., Boston, Mass.
- Furnaces, Foundry.**
Byram & Co., Detroit, Mich.
- Gas Governors.**
N. Y. Gas Saving Co., Decker Building, Union Square, N. Y.
- Gas Producers.**
Wood, K. D. & Co., Philadelphia, Pa.
- Gas & Steam Fitters' Supplies.**
Pancoast, Henry B. & Co., Phila., Pa.
- Gauge, Rolling Mill.**
Daines Gauge Co., Philadelphia, Pa.
- Gear Cutters.**
D. E. Whiton Mach. Co., New London, Conn.
- Gears.**
Boston Gear Works Boston, Mass.
Foote, Robt. & Son Co., Baltimore, Md.
U. S. Projectile Co., Brooklyn, N. Y.
- Glass Boards.**
Canton Saw Co., Canton, O.
- Glass Cutters.**
Monce, S. G., Bristol, Conn.
- Glue.**
Baeder, Adamson & Co., Phila., Pa.
Dodd, A. W. & Co., Gloucester, Mass.
Russell Cement Co., Gloucester, Mass.
- Grass Catchers.**
Supplee Hardware Co., Phila., Pa.
- Grinding Mills.**
Foss Mfg. Co., Springfield, O.
- Grinding and Polishing Machines.**
Norton Emery Wheel Co., Worcester, Mass.
- Grindstone Dressing Machinery.**
Blake & Johnson, Waterbury, Conn.
- Grindstones.**
Cleveland Stone Co., Cleveland, O.
- Gun Implements.**
Union Edw. Co., Torrington, Conn.
- Gunpowder, Makers of.**
Lafin & Rand Powder Co., 29 Murray St., N. Y.
- Hand Carts.**
Lansing Wheelbarrow Co., Lansing, Mich.
- Handles.**
New York Mallet and Handle Wks. 456 E. Houston St., N. Y.
- Handle Couplings.**
Bourke Mfg. Co., Youngstown, O.
- Hangers, Door.**
Chicago Spring Butt Co., Chicago, Ill.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
Lane Bros., Poughkeepsie, N. Y.
Victor Mfg. Co., Newburyport, Mass.
- Hardware Comm'n Merchants.**
Graham, John H. & Co., 111 Chambers St., New York.
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**
Stearns, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 103 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs.' Agents.**
Bingham, W. Co., Cleveland, O.
Clarke, Thomas, St. John, N. B.
Graham, John H. & Co., 113 Chambers, Sickles, Sweet & Lyon, 35 Barclay, N. Y.
- Hardware Specialties.**
Acme Shear Co., Bridgeport, Conn.
Berger Bros., Philadelphia, Pa.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Haines & Zimmerman, Phila., Pa.
Johnson, S. C., Racine, Wis.
Knapp & Cowles Mfg. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Philadelphia, Pa.
Peabody & Parks, Troy, N. Y.
Scranton Co., New Haven, Conn.
Wilson, J. Fred, Worcester, Mass.
- Harness Snaps.**
Covert Mfg. Co., West Troy, N. Y.
Coverts' Saddlery Wks., Farmer, N. Y.
Fitch, W. & E. T., New Haven, Conn.
- Hoisting Machines.**
Box, Alfred & Co., 314 Green, Phila.
Jewett, Hoisting & Conveying Mch. Co., Cleveland, Ohio.
Fulton Iron & Engine Wks., Detroit, Mich.
Harrington, E., Son & Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 96 Liberty, N. Y.
McCoy, Jos. F. & Co., 24 Warren St.
Maris & Beekley, Philadelphia.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila. and N. Y.
Spindel, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.
- Hollow Ware.**
Avery Stamping Co., Cleveland, O.
Bronson Supply Co., Cleveland, Ohio.
Cleveland Stamping & Tool Co., Cleveland, O.
- Hollow Ware, Aluminum.**
Illinois Pure Aluminum Co., Lemont, Ill.
Stuart & Peterson Co., Phila., Pa.
- Horse Nails, Makers of.**
Capwell Horse Nail Co., Hartford, Conn.
National Horse Nail Co., Vergennes, Vt.
Putnam Nail Co., Neponset, Boston, Mass.
- Horse and Mule Shoes, Makers of.**
Bryden Horse Shoe Co., Catsaqua, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence.
Shoenberger & Co., Pittsburgh, Pa.
Standard Horse Shoe Co., Boston, Mass.
- Hose Menders.**
Hudson, C. E. & Co., Leominster, Mass.
Jones, M. D. & Co., Boston, Mass.
- Hose.**
Cleveland Rubber Works, Cleveland, O.
N. Y. Setting & Packing Co., Ltd., 10 Park Row, N. Y.
- Hydrants, &c.**
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Forging.**
U. S. Projectile Co., Brooklyn, N. Y.
- Hydraulic Jacks.**
Dudgeon, Richard, 24 Columbia, N. Y.
McCoy, Jos. F. Co., 24 Warren St., N. Y.
Watson & Stillman, 204 E. 43d, N. Y.
- Ice Breakers.**
Clement & Dunbar, Philadelphia, Pa.
Wharton, Jos. S. Lovering, Phila., Pa.
- Ice Cream Freezers.**
Clement & Dunbar, Phila., Pa.
North Bros. Mfg. Co., Phila., Pa.
Thomson, C. W., Philadelphia, Pa.
White Mountain Freezer Co., Nashua, N. H.
- Injectors.**
Bynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., New York.
- Insurance, Boiler.**
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel, Swedish.**
Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., 1 Broadway, N. Y.
- Iron Commission Brokers.**
Corning, Edw. & Co., 29 E. 12th, N. Y.
Cotton, Barclay W. & Co., Phila.
Etting, Edw. J., Philadelphia.
Hogan, John L. & Co., Philadelphia, Pa.
Hoffman, J. W. & Co., Philadelphia.
Levis, Henry & Co., Philadelphia.
Reeley, Jerome & Co., Philadelphia.
Lee, J. Samuel & Co., Philadelphia.
Moar, J. J., 490 Walnut, Philadelphia.
Pilling & Crane, Philadelphia, Pa.
Wister, L. & R. & Co., Phila., Pa.
- Iron Ore.**
Samuel, Frank, Philadelphia, Pa.
- Iron, Merchants.**
Barnes, C. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Essenhaus & Cumfrie, Philadelphia.
Corning Edw. & Co., 29 E. 12th, N. Y.
Cox, Justice Jr., Philadelphia.
Cotton, Barclay W. & Co., Phila.
Hoffman, J. W. & Co., Philadelphia.
Leonard, J., 446 West St., N. Y.
Nicolls, Wheeler & Co., Philadelphia.
Ogden & Wallace, 85 Elm St., N. Y.
Pierston & Co., 29 Broadway, N. Y.
Thomson, W. H. & Co., Phila.
Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.
Whitney, A. R. & Co., 17 E. 17th, N. Y.
Wilson, S. H. & Co., Philadelphia.
- Iron, Importers.**
Adopt Wheelock & Co., N. Y. and Boston.
Lundberg, Gustaf, Boston, Mass.
- Iron, Sheet, Manufacturers of.**
Cambridge Iron & Steel Co., Cambridge, Ohio.
W. Dewees Wood Co., Lima, McKeesport, Pa.
- Iron Vases.**
Walbridge & Co., Buffalo, N. Y.
- Ironwork, Ornamental.**
Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Maat, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Keys.**
Wollensak, J. F., Chicago, Ill.
- Ladders, Rolling.**
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
- Ladles.**
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamps.**
Plume & Atwood Mfg. Co., New York.
Standard Lighting Co., Cleveland, O.
- Lamp Stoves.**
Glazier Stove Co., Chelsea, Mich.
Plume & Atwood Mfg. Co., 18 Murray Street, New York.
- Lanterns.**
Steam Gauge & Lantern Co., Syracuse N. Y.
- Lathes.**
Draper Machine Tool Co., Worcester, Mass.
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, Wire.**
Clinton Wire Cloth Co., Clinton, Mass.
N. Y. Wire Cloth Co., Canton, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Laundry Machines.**
Johnson, S. C., Racine, Wis.
- Lawn Mowers.**
Blair Mfg. Co., Springfield, Mass.
Chadborn & Coldwell Mfg. Co., Newburg, N. Y.
Coldwell Lawn Mower Co., Newburg, N. Y.
Dille & McGuire Mfg. Co., Richmond, Ind.
Enterprise Mfg. Co., Philadelphia, Pa.
F. & N. Mfg. Co., Richmond, Ind.
Hensley, M. C., Richmond, Ind.
Maat, Foss & Co., Springfield, O.
Philadelphia Lawn Mower Co., Philadelphia, Pa.
Supplee Hdw. Co., Phila., Pa.
- Lawn Rakes.**
Gibbs Mfg. Co., Canton, Ohio.
Konier, F. E. & Co., Canton, O.
- Lawn Sprinklers.**
Blair Mfg. Co., Springfield, Mass.
Ette & Henger Mfg. Co., St. Louis.
Gibbs Mfg. Co., Canton, Ohio.
McGowan, John H. Co., Cincinnati, O.
Portland Lawn Sprinkler Co., Portland, Me.
- Lemon Squeezers.**
Kiepy Mfg. Co., Unionville, Conn.
- Letters and Figures, Metallic.**
White, A. A. & Co., Providence, R. I.
- Letters, Paper.**
Tablet & Ticket Co., Chicago, Ill.
- Levels.**
Richardson, O. F., & Son Athol, Mass.
- Locks and Knobs, Manufacturers of.**
Deitz, A. E., 97 Chambers, N. Y.
Reading Edw. Co., Reading, Pa.
Smith & Egge Mfg. Co., Bridgeport, Conn.
Yale & Towne Mfg. Co., Stamford, Conn.
- Lubricants.**
Dixon, Jos., Crucible Co., Jersey City, N. J.
- Machinery.**
Am. Tool Works, Cleveland, Ohio.
Barnes, W. F. & John, Rockford, Ill.
Sement, Miles & Co., Philadelphia, Pa.
Bigelow, C. E., 45 Dey, N. Y.
Bigman & Keeler Mfg. Co., St. Louis.
Bliss, E. W. Co., Brooklyn, N. Y.
Bridgeport Mch. Tool Works, Bridgeport, Conn.
Briggs, Marvin, 12 Broadway, N. Y.
Carlin's Sons, Thos., Allegheny, Pa.
Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
Detrick & Harvey Mch. Co., Baltimore, Md.
Dietz, Schumacher & Co., Cincinnati, Ohio.
Fitchburg Mch. Works, Fitchburg, Mass.
Garvin Mch. Co., Laight & Canal Sts., Gould & Eberhardt, Newark, N. J.
Hamilton Mch. Tool Co., Hamilton, O.
Harrington, E. Son & Co., Phila., Pa.
Henderer, A. L., Wilmington, Del.
Hender Machine Co., Torrington, Ct.
Hill, Clarke & Co., Boston, Mass.
Howard & Morse, 45 Fulton St., N. Y.
Hubert-Rogers Mch. Co., South Sudbury, Mass.
Johnson, Israel H., Jr., & Co., Phila.
Jones & Lanson Mch. Co., Springfield, Vt.
Lovegrove & Co., Philadelphia, Pa.
McCabe, J. J., 68 Cortlandt, N. Y.
Machinists Supply Co., Rochester, N. Y.
Manville, E. J. Mch. Co., W. Waterbury, Conn.
Newark Mch. Tool Works, Newark, N. J.
New Haven Mfg. Co., New Haven, Conn.
New York Machinery Depot, 178 Broadway, New York.
Niles Tool Wks., 138 Liberty St., N. Y.
Pittsburgh Mfg. Co., Pittsburgh, Pa.

- Place, Geo.**, 120 Broadway, N. Y.
Poole, Robt. & Son Co., Baltimore Md.
Powell Planer Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.
Frontiss Tool & Supply Co., N. Y.
Scranton Supply & Machinery Co., Scranton, Pa.
Sellers, Wm. & Co., Phila.
Seyfert's Sons L. F., Philadelphia Pa.
Stephens, J. & Co., Cincinnati, O.
Stow Flexible Shaft Co., Ltd., Phila.
Toomey, Frank, Philadelphia Pa.
Wetherill, Robert & Co., Chester, Pa.
Wickes Bros., Saginaw, Mich.
Wilson, W. A., Rochester, N. Y.
- Machinery for Hardware Manufacturers.**
Adt, Jno. & Son. New Haven Conn.
- Machine Knives.**
Loring Coes & Co., Worcester Mass.
Loyd, John, 552-553 Water St., N. Y.
- Machine Tools.**—See Machinery.
- Machine Work.**
Papping, J., 58th St., & 11th Ave. City.
- Machinists' Scales.**
Coffin & Leighton, Syracuse, N. Y.
Starrett, L. S., Athol, Mass.
- Machinists' Tools and Supplies.**
King, J. M. & Co., Waterford, N. Y.
Sellers, Wm. & Co., Inc., Phila.
- Mallets.**
N. Y. Mallet & Handle Works, N. Y.
- Mangles.**
Johnson, S. C., Racine, Wis.
- Manufacturing Sites.**
Illinois Central R. R., Chicago, Ill.
- Measuring Tapes.**
Keuffel & Esser Co., New York.
Lufkin Rule Co., Saginaw, Mich.
- Mechanical Instruction.**
Correspondence School of Mechanics, Scranton, Pa.
- Metals.**
Fearing, Wm. S., 100 Chambers N. Y.
Hendricks Bros., 49 Cliff, N. Y.
- Metal Brokers.**
American Metal Co., N. Y.
- Metallurgists.**
Britton, J. Blodgett, Phila., Pa.
- Mincing Knives.**
Palmer Hdw. Mfg. Co., Troy, N. Y.
- Mine Lamps.**
Darby, Edw. & Sons, Phila. Pa.
Leonard, B. E., Scranton, Pa.
- Mining Screens.**
Harrington & King Perforating Co., Chicago, Ill.
Howard & Morse, 45 Fulton, N. Y.
- Models, Makers of.**
Franklin, H. H. Mfg. Co., Syracuse, N. Y.
Ideal Machine Works, Hartford, Conn.
Rhodes, L. E. Co., Hartford, Conn.
- Molding Sand.**
Obermayer, S. Co., Cincinnati, O.
- Motors, Water and Electric.**
O. & C. Electric Co., 402 and 404 Greenwich St., N. Y.
Dallett, Thos. H. & Co., Phila., Pa.
- Nail Machinery.**
Pittsburgh Mfg. Co., Pittsburgh, Pa.
- Nail Pullers.**
Graham, John H. & Co., 113 Chambers Street, N. Y.
Scranton Co., New Haven, Conn.
Specialty Mfg. Co., Hartford, Conn.
- Nails (Cut) and Spikes.**
Borden & Lovell, 70 West, N. Y.
Cumberland Nail & Iron Co., Phila.
Oxford Iron Co., 81 Washington Pottstown Iron Co., Pottstown, Pa.
Riverside Iron Wks., Wheeling, W. Va.
Valley Steel Co., St. Louis, Mo.
- Nickel Platers' Supplies.**
Eddy Electric Mfg. Co., Windsor, Conn.
- Norway Shapes, Rollers of.**
Rowland, William & Harvey, Hartford, Philadelphia
- Novelty Manufacturers.**
Franklin, H. H. Mfg., Syracuse, N. Y.
Ideal Machine Works, Hartford, Conn.
- Nut Machines.**
Dunham Nut Co., Unionville, Ct.
- Nuts, Bolts, &c., Makers of.**
American Bolt Co., Lowell, Mass.
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Dunham Nut Co., Unionville, Conn.
Haskell, Wm. H. Co., Pawtucket, R. I.
Mt. Carmel Bolt Co., Mt. Carmel, Conn.
Pennsylvania Bolt & Nut Co., Lebanon Pa.
Port Chester Bolt and Nut Co., Port Chester, N. Y.
Russell, Burdall & Ward, Port Chester
Sternbergh, J. B. & Son, Reading, Pa.
Wilson, J. Fred., Worcester, Mass.
Wm. H. Haskell Co., Pawtucket, R. I.
- Oil Stones.**
Pike Mfg. Co., Pike Station, N. H.
- Oil Stoves.**
Glazier Stove Co., Chelsea, Mich.
- Ores.**
Wister, Francis, Philadelphia Pa.
- Ox Bow Pins.**
Sawyer, O. C., Sharon, Vt.
- Ox Shoes.**
Scranton Forging Co., Scranton, Pa.
- Packing.**
Morrison, Robert, St. Louis, Mo.
N. Y. Belting & Packing Co., Ltd., N. Y.
- Padlocks.**
Ames Sword Co., Chicopee, Mass.
Truman, E. T., Lancaster, Pa.
Hillebrand & Wolf, Phila., Pa.
Shultz Mfg. Co., Phila., Pa.
- Paint.**
Garry Iron & Steel Roofing Co., Cleveland, O.
- Paint Burners.**
Janvier Stove & Mfg. Co., Cleveland, O.
- Paint Cans.**
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Pants Stretcher.**
Covert Mfg. Co., West Troy, N. Y.
- Patent Solicitors.**
Butler, C. N., Phila., Pa.
Johnson & Howson, Phila. & Washington
Tanner, H. W. T., Washington, D. C.
Stocking, E. B., Washington, D. C.
- Perforated Metal.**
Clinton Wire Cloth Co., Clinton, Mass.
Harrington & King Perforating Co., Chicago, Ill.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.
- Phosphor Bronze.**
Phosphor Bronze Smelting Co., Limited, Philadelphia.
- Phosphor Tin.**
Orescent Phosphorized Metal Co., Philadelphia, Pa.
Talk & Naumann, 516 Pearl, N. Y.
- Picks and Mattocks.**
Flumo, Fayette R., Philadelphia, Pa.
- Pig Iron.**
Houston, C. B. & Co., Philadelphia, Pa.
Montour Iron & Steel Co., Danville, Pa.
Naylor & Co., 45 Wall, N. Y.
Pilling & Crane, Philadelphia, Pa.
Samuel, Frank, Philadelphia, Pa.
- Pig Iron Storage.**
Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.
- Pile Drivers.**
Vulcan Iron Wks., Chicago, Ill.
- Pipe, Bent.**
National Pipe Bending Co., New Haven
- Pipe Cutting and Threading Machines.**
Signal & Keeler Mfg. Co., St. Louis, Mo.
Merrill Mfg. Co., Toledo, O.
Pancoast Henry B. & Co., Philadelphia, Pa.
Saunders' Sons, D., Yonkers, N. Y.
Walworth Mfg. Co., Boston, Mass.
- Pipe Grips.**
Prentiss Vise Co., 44 Barclay, N. Y.
- Pipes, Fittings, &c. Makers of.**
McNab & Hanna Mfg. Co., N. Y.
- Pipe, Water and Gas, Makers of.**
Cumberland Nail & Iron Co., Phila., Pa.
Donaldson Iron Co., Emaus, Pa.
Klyside Iron Works, Wheeling, W. Wood, R. D. & Co., Philadelphia, Pa.
- Plane Irons, Manufacturers of.**
Buck Bros., Millbury, Mass.
Buck, Chas., Millbury, Mass.
- Planes, Manufacturers of.**
Stanley Rule & Level Co., N. Y.
- Planter and Hoe.**
Ayers, J. R., Petersburg, Va.
- Plated Ware.**
Bozeman, L. & Son, New Bedford, Ct.
Holmes & Edwards Silver Co., Bridgeport, Conn.
Rogers, Wm. Mfg. Co., Hartford, Ct.
- Plate, Iron and Steel, Mfgs. of.**
Atlas-Standard Iron & Steel Co., Bridgeport, O.
Lukens Iron & Steel Co., Coatesville, Pa.
Mahoning Valley Iron Co., Youngstown, Ohio.
Moorhead-McLean Co., Pittsburgh, Pa.
Milvain & Sons, Reading, Pa.
Pottstown Iron Co., Pottstown, Pa.
Pottsville Iron & Steel Co., Pottsville, Pa.
Singer, Nimick & Co., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Wallman Iron & Steel Co., Thurlow, Pa.
Wood Alan Co., Philadelphia.
- Plating, Nickel, Brass and Silver.**
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Plow Shares.**
Star Mfg. Co., Carpentersville, Ill.
- Pokes.**
Bishop, A. W., Berea, Ohio.
- Polishing Machines.**
Watson & Salzman, 204 E. 43d, N. Y.
- Post Hole Diggers.**
Suckeye Mfg. Co., Union City, Ind.
Gibbs Mfg. Co., Canton, Ohio.
Wister, L. & E. Co., Philadelphia, Pa.
- Poultry Nettings.**
Barnum, E. T., Detroit, Mich.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
"Silver Finish."
Tyler Wire Wks. Co., W. S., Cleveland, O.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Powder.**
Lafin & Rand Powder Co., 29 Murray New York Powder Co., 62 Liberty St., N. Y.
- Power Hack Saws.**
Millers Falls Co., 83 Reade St., N. Y.
- Power Hammers.**
Olenetz & Eisenhardt, Philadelphia.
Dupont Mfg. Co., St. Johnsbury, Vt.
Jenkins & Lingie, Bellefonte, Pa.
Scranton & Co., New Haven, Conn.
- Presses, Dies, &c.**
E. W. Bliss Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.
Waterbury Mch. Co., Waterbury, Conn.
- Presses, Power, Makers of.**
Bliss, E. W. Co., Brooklyn, N. Y.
Manville, E. J. Mch. Co., Waterbury, Ct.
Stark Mch. & Tool Co., Buffalo, N. Y.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
- Pruners.**
Topliff & Ely Co., Elyria, Ohio.
- Pulleys.**
Keystone Clutch Mch. Wks., Phila., Pa.
Lake, J. H. & D. Co., Massillon, Ohio.
- Pumping Machinery.**
Dean Bros. Steam Pump Works, Indianapolis, Ind.
Hooker-Colville Steam Pump Co., St. Louis, Mo.
Megowan, J. H. & Co., Cincinnati, O.
Maslin, J. & Son, Jersey City, N. J.
Norwalk Iron Wks. Co., So. Norwalk, Conn.
Southwark Fdy. & Mch. Co., Phila., Pa.
Valley Pump Wks., Easthampton, Mass.
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Pumps, Makers of.**
Bellevue Pump Co., Bellevue, Iowa.
Dunning Co., Salem, N. J.
Douglas, W. & B., Middletown, Conn.
East, Foss & Co., Springfield, O.
Myers, F. E. & Bro., Ashland, O.
- Punches.**
Richards, I. P., Providence, R. I.
- Punches and Shears, Hand and Power.**
E. W. Bliss Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Cross & Speirs Machine Co., Waterbury, Conn.
Henderson, A. L., Wilmington, Del.
Stark Mch. & Tool Co., Buffalo, N. Y.
Stiles & Parker Press Co., Brooklyn, N. Y.
Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.
Watson & Stillman, 204 E. 43d, N. Y.
- Rails, Old and New.**
Ferry, W. H. & Co., Providence, R. I.
- Rat and Mouse Traps.**
Ester, W. S., 65 Fulton, N. Y.
Ripley Mfg. Co., Unionville, Conn.
- Razors.**
J. R. Torrey Razor Co., Worcester, Mass.
- Reels.**
Hendryx, A. B. Co., New Haven, Conn.
- Refrigerator Door Fasteners.**
Conroy, P. J. & Co., Philadelphia.
- Rivets.**
Blake & Johnson, Waterbury, Conn.
Boyce Rivet Co., Muncie, Ind.
Burden Iron Co., Troy, N. Y.
Clark & Cowles, Plainville, Conn.
Gobb & Drew, Plymouth, Mass.
Sternbergh, J. B. & Son, Reading, Pa.
Townsend, W. P. & Co., New Brighton, Pa.
- Riveting Machines.**
Adt, Jno. & Sons, New Haven, Conn.
- Rock Drills.**
Band Drill Co., 23 Park Place, N. Y.
- Rolling Mill Machinery.**
Birmingham Iron Fdry., Birmingham, Conn.
Booth, The Lloyd Co., Youngstown, O.
Leechburg Foundry & Mch. Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Robinson-Rea Mfg. Co., Pittsburgh.
Totten & Hogg Iron and Steel Fdry. Co., Pittsburgh, Pa.
Trethewey Mfg. Co., Pittsburgh, Pa.
Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.
- Rolls, Chilled, Sand and Steel.**
Birmingham Iron Foundry, Birmingham, Conn.
Booth, The Lloyd Co., Youngstown, O.
East Chicago Fdy Co., Chicago, Ill.
Garrison, A. Fdy. Co., Pittsburgh, Pa.
Robinson-Rea Mfg. Co., Pittsburgh, Pa.
seaman, Sleigh & Black, Pittsburgh.
Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.
- Roofing.**
Berlin Iron Bridge Co., E. Berlin, Conn.
Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.
Johns, H. W. Mfg. Co., 87 Maiden Lane.
Kanneberg Roofing Co., Canton, O.
N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.
- Rope and Web Goods.**
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Wks., Farmer N. Y.
- Rope Wheels.**
Cresson, Geo. V. Co., Philadelphia, Pa.
- Rubber Goods.**
Cannfield, H. O., Bridgeport, Conn.
- Rules, Manufacturers of.**
Keuffel & Esser Co., New York.
Lufkin Rule Co., Saginaw, Mich.
Stanley Rule & Level Co., 28 Chambers.
- Rust Preventive.**
Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.
- Sand Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Sash Balances.**
Calliwell Mfg. Co., Rochester, N. Y.
Fulman Sash Balance Co., Rochester, N. Y.
Stearns, E. C. & Co., Syracuse, N. Y.
- Sash Cords and Chains.**
Morton, Thos., 65 Elizabeth, N. Y.
Ossawan Mills Co., Norwich, Conn.
Samsom Cordage Works, Boston, Mass.
Smith & Egge, Mfg. Co., Bridgeport.
- Sash Locks.**
Ives, H. B. & Co., New Haven, Conn.
- Sash Pulleys.**
Palmer Hardware Mfg. Co., Troy, N. Y.
- Sash Weights.**
Brown, E. E. & Co., Philadelphia, Pa.
Norton Bros., Chicago, Ill.
- Saw Filing Machines.**
Djstson, Henry & Sons, Philadelphia, Pa.
- Saws, Makers of.**
Djstson, Henry & Sons, Phila., Pa.
National Saw Co., 90 Meade St., N. Y.
Simonds Mfg. Co., Kitchburg, Mass.
- Saw Vises.**
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Saw Sets.**
Taintor Mfg. Co., 84-86 Chambers, N. Y.
- Scales, Manufacturers of.**
Buffalo Scale Co., Buffalo, N. Y.
Chadillon, John & Sons, 85-87 Cliff, N. Y.
- Scrapers, Road.**
Am. Steel Scraper Co., Sidney, Ohio.
Kilbourne & Jacobs Mfg. Co., Columbus, O.
Sidney Steel Scraper Co., Sidney, O.
- Screens, Coal and Ore.**
Hendrick Mfg. Co., Ltd., Carbondale, Pa.
- Screens, Door and Window.**
Phillips, A. J. & Co., Fenton, Mich.
White, Van Glann & Co., 15-17 Chatham Sq., N. Y.
- Screw Cutting Machinery.**
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Screw Drivers.**
Brown, R. H. & Co., New Haven, Conn.
Mayhew, A. E. Co., Shelburne Falls, Mass.
- Screw, Plate and Pipe Cutter.**
Jarecki Mfg. Co., Erie, Pa.
- Screws, Makers of.**
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Wm. H. Haskell Co., Pawtucket, R. I.
Miles, F. S., 305 Quarry, Philadelphia.
Reynolds & Co., New Haven, Conn.
Worcester Machine Screw Co., Worcester, Mass.
- Scroll Saws.**
Barnes, W. F. & John, Rockford, Ill.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Scythe Stones and Whetstones.**
Pike Mfg. Co., Pike Station, N. H.
Cleveland Stone Co., Cleveland, O.
- Shafting, Makers of.**
Cresson, Geo. V. Co., Philadelphia, Pa.
Fairmount Mch. Co., Philadelphia, Pa.
Fittsimons & Co., Cleveland, Ohio.
Sellers, Wm. & Co., Inc., Phila., Pa.
Stow Mfg. Co., Poughkeepsie, N. Y.
- Shaped Iron and Steel, Manufacturers of.**
Atlas-Standard Iron & Steel Co., Bridgeport, O.
East Chicago Fdy Co., Chicago, Ill.

Allentown Rolling Mill, Allentown, Pa.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Passaic Rolling Mill Co., Paterson, N.J.
Pottsville Iron & Steel Co., Pottsville, Pa.
Roberts, A. & P. & Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.

Shears and Scissors.

Acme Shear Co., Bridgeport, Conn.
Heinrichs, R. Sons Co., Newark, N. J.

Sheet Iron and Steel, Manufacturers of.

Etna-Standard Iron and Steel Co., Bridgeport, O.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Chess Bros., Pittsburgh, Pa.
Mahoning Valley Iron Co., Livingston, Ohio.
Morehead-McCleane Co., Pittsburgh, Pa.
Pierson & Co., 29 Broadway, N. Y.
Singer Nimick & Co., Ltd., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
The Mahoning Valley Iron Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.

Sheet Zinc.

Matthiessen & Hegeler Zinc Co., La Salle, Ill.

Sinks.

Douglas, W. & B., Middletown, Conn.

Skates, Ice.

Lovell, Jno. P. Arms Co., Boston, Mass.
Winslow, Saml., Skate Mfg. Co., Worcester, Mass.

Skates, Roller.

Henler, M. C., Richmond, Ind.
Union Hardware Co., Torrington, Conn.
Winslow, Saml., Skate Mfg. Co., Worcester, Mass.

Smelting Works.

Reeves, Paul S., 760 S. Broad, Phila.

Soldering Coppers.

Clendenin Bros., Baltimore, Md.
Covert Mfg. Co., West Troy, N. Y.

Speaking Tubes.

Ostrander, W. R. & Co., 204 Fulton St., N. Y.
Wollensak, J. F., Chicago, Ill.

Specialties, Pat. Articles.

Rhodes, L. E. Co., Hartford, Conn.

Spelter.

Matthiessen & Hegeler Zinc Co., La Salle, Ill.
Missouri Metal Co., St. Louis, Mo.

Spoons and Forks.

Boardman, L. & Son, New Haddam, Conn.
Holmes & Edwards Silver Co., Bridgeport, Conn.
Bogers, The Wm. Mfg. Co., Hartford, Conn.

Sporting Goods.

Hartley & Graham, 818-815 E'way, N. Y.

Springs.

Clark & Cowles, Plainville, Ct.
Dunbar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Soland, Wm. & Harvey, Phila., Pa.
Sabin Machine Co., Montpelier, Vt.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.

Spring Hinges.

Bommer Bros., Brooklyn, N. Y.
Chicago Spring Butt Co., Chicago, Ill.
Fullman Sash Balance Co., Rochester, N. Y.
Stover Mfg. Co., Freeport, Ill.
Van Wagoner & Williams Hdw. Co., 14 Warren St., N. Y.

Stamped Ware.

Am. Stamping Co., 104 & 106 John St., New York.

Stamping Works.

Avery Stamping Co., Cleveland, O.
Cleveland Stamping & Tool Co., Cleveland, O.

Staples.

Cobb & Drew, Plymouth, Mass.
Titchener E. H. & Co., Binghamton, N. Y.

Steam Gauges.

Bristol Co., Waterbury, Conn.

Steam Hammers, &c., Makers of.

Dienelt & Eisenhardt, Philadelphia.
Dudgeon, Richard, 24 Columbia Street, N. Y.
Trethewey Mfg. Co., Pittsburgh, Pa.

Steam Heating.

Webster Warren & Co., Camden, N. J.

Steam Separators.

Gouvert Mfg. Co., 32 Cortland St., N. Y.
Harrison Safety Boiler Wks., Phila., Pa.

Steel, Cold Rolled Strip.

Superior Steel Co., Pittsburgh, Pa.
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

Steel Figures and Alphabets.

Krogerud, W., 61 Fulton St., N. Y.

Steel Importers.

Abbott, Wheelock & Co., N. Y. and Boston.
Hobson, Francis, Seaman & Co., 97 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Milne, A. & Co., 1 Broadway, N. Y.
Newton & Shipman, 83 John, N. Y.
Wetherell Bros., 93 Liberty St., N. Y.
Whitney, A. R. & Co., B'dway, N. Y.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.

Steel (Mushet's Special).

Jones, B. M. & Co., Boston.

Steel Manufacturers.

Etna-Standard Iron & Steel Co., Bridgeport, O.
Bethlehem Iron Co., S. Bethlehem, Pa.
Baker, Herman & Co., 108 Duane St., Carbon Steel Co., Pittsburgh, Pa.
Wooten & S. C. Schneidm., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburgh, Pa.
Frankford Steel Co., Philadelphia.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Hobson, Francis, Seaman & Co., 97 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Kaiser, Ellison & Co., Sheffield, Eng.
La Belle Steel Co., Pittsburgh, Pa.
Lukens Iron & Steel Co., Coatesville, Pa.
Moorehead-McCleane Co., Pittsburgh, Pa.
Pottsville Iron and Steel Co., Pottsville, Pa.
Rowland, Wm. & Harvey, Frankford, Philadelphia.
Singer, Nimick & Co., Pittsburgh, Pa.
Superior Steel Co., Pittsburgh, Pa.
Valley Steel Co., St. Louis, Mo.
Wooten & S. C. Schneidm., Eng.
Wetherell Bros., 93 Liberty, N. Y.
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

Steel, Manufacturers' Agents.

Barnes, C. K. & Co., Philadelphia, Pa.
Corning, Edw. & Co., 29 E'way, N. Y.
Lindsay, Jas. G. & Co., Phila., Pa.
Pierson & Co., 29 Broadway, N. Y.

Steel Rails, Manufacturers of.

Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Iron Co., Johnstown, Pa.
Schenck Iron & Steel Co., Danville, Pa.
Riverside Iron Wks., Wheeling, W. Va.

Steel, Tool.

Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburgh, Pa.

Step Ladders.

Bicycle Step Ladder Co., Chicago, Ill.
Croissant, M., Albany, N. Y.

Stocks and Dies.

Armstrong Mfg. Co., Bridgeport, Conn.
Billings & Spencer Co., Hartford, Conn.
Butterfield & Co., Derby Line, Vt.
Hart Mfg. Co., Cleveland, O.
Sauder's Sons, D., Yorkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Willey & Russell Mfg. Co., Greenfield, Mass.

Stove Linings.

Ostrander Fire Brick Co., Troy, N. Y.

Stove Pipe Thimbles.

Cheney, S. & Son Manlius, N. Y.

Street Lamps.

Steam Gauge & Lantern Co., Syracuse, N. Y.

Strops.

J. R. Torrey & Co., Worcester, Mass.

Structural Iron Work.

Berlin Iron Bridge Co., East Berlin, Conn.
Lindsay, Jas. G. & Co., Phila., Pa.

Sulphuric Acid.

Matthiessen & Hegeler Zinc Co., La Salle, Ill.

Tacks, Brads, Staples, &c.

Atlas Tack Corporation, Boston, Mass.
Clendenin Bros., Baltimore, Md.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.

Taps and Dies.

Butterfield & Co., Derby Line, Vt.
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.
Manning, Maxwell & Moore, 111 Liberty St., N. Y.
Wells Bros. & Co., Greenfield, Mass.
Willey & Russell Mfg. Co., Greenfield, Mass.

Testing Laboratories.

Riehle Bros. Testing Mch. Co., Philadelphia.

Testing Machines.

Riehle Bros. Testing Mch. Co., Phila.

Theatrical Hardware.

Wollensak, J. F., Chicago, Ill.

Thill Springs.

Frost Thill Spring Co., Boston, Mass.
Sabin Machine Co., Montpelier, Vt.

Timber and Mineral Lands.

Robertson, E. Co., Cincinnati, O.

Time Record.

Scattergood, H. W., Phila., Pa.

Tin Plate Machinery.

Lloyd Booth Co., Youngtown, Ohio.

Tinware.

Am. Stamping Co., 104 & 106 John St.,

Tire Upsetters.

Butts & Ordway, Boston, Mass.

Toe Calks, Steel.

Burke, F. F., Boston, Mass.

Tool Blocks.

Hulbut-Rogers Mch. Co., South Sudbury, Mass.

Tool Chests.

Am. Tool Co., 200 W. Houston St., N. Y.

Tool Holders.

Armstrong Bros. Tool Co., Chicago, Ill.

Tools.

Britton, Horace E., Stoughton, Mass.
Brown, R. H. & Co., New Haven, Conn.
Fraser Co., 19 Warren St., New York.
Hurley Bros., Hartford, Conn.
Mayhew, H. R. Co., Shelburne Falls, Mass.
Millers Falls Co., 98 Reade, N. Y.
Richardson, C. F. & Son, Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, New York.
Starrett, L. S., Athol, Mass.
Wilkinson, A. J. & Co., Boston, Mass.

Tools, Blacksmith and Wheelwrights.

Buffalo Forge Co., Buffalo, N. Y.
Butts & Ordway, Boston, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Plumb, Fayette R., Philadelphia, Pa.
Willey & Russell Mfg. Co., Greenfield, Mass.

Tools, Steam and Gas Fitters.

Saunders' Sons, D., Yonkers, N. Y.

Torches, Oil and Gasoline.

Danier Stove & Mfg. Co., Cleveland, O.
Schneider & Trenkamp Co., Cleveland, Ohio.
Standard Lighting Co., Cleveland, O.

Transom Lifters.

Wollensak, J. F., Chicago, Ill.

Tricycles.

Toledo Metal Wheel Co., Toledo, Ohio.

Trucks, Manufacturers of.

Clark, G. F., Windsor Locks, Conn.
Lansing Wheelbarrow Co., Lansing, Mich.

Tubes, Seamless Drawn Copper.

Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Randolph & Clowes, Waterbury, Conn.

Tubes, Steel.

Leng's John S. Son & Co., 4 Fletcher St., New York.
U. S. Projectile Co., Brooklyn, N. Y.

Tumbling Barrels.

Henderson Bros., Waterbury, Conn.

Turnbuckles.

Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., Brooklyn, E. D.

Twist Drills, Makers of.

Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Machine Co., New Bedford, Mass.
New Process Twist Drill Co., Taunton, Mass.
Standard Tool Co., Cleveland.

Valves, Gas, Water and Steam.

Best, Fox & Co., Pittsburgh, Pa.
Chapman Valve Mfg. Co., Boston.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., 71 John, N. Y.
Lunkenheimer Co., Cincinnati, O.
McNab & Harlin Mfg. Co., 56 John N. Y.

Ventilator Appliances.

Howard & Morse, 45 Fulton St., N. Y.

Vise Jaws.

Newark Mch. Tool Co., Newark, N. J.

Vises.

Athol Machine Co., Athol, Mass.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Millers Falls Co., 98 Reade St., N. Y.
Prentiss Vise Co., 44 Barclay, N. Y.
Van Wagoner & Williams Hdw. Co., 14 Warren St., N. Y.

Wagon Jacks.

Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.

Washers.

Haskell, Wm. H. Co., Pawtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Steinbergh, J. H. & Son, Reading, Pa.

Washing Machines.

Benbow Mfg. Co., St. Louis, Mo.

Water Meters.

Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Water Wheels.

Poole, Robt. & Son Co., Baltimore, Md.

Wheelbarrows.

Amer. Steel Scraper Co., Sidney, Ohio.
Byran Mfg. Co., Byran, Ohio.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Lansing Wheelbarrow Co., Lansing, Mich.
Sidney Steel Scraper Co., Sidney, O.

Window Cord, Makers of.

Samson Cordage Works, Boston, Mass.

Wire, Manufacturers of.

Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
New Haven Wire Mfg. Co., New Haven, Conn.
Salem Wire Nail Co., Salem, O.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester.
Wetherell Bros., 93 Liberty St., N. Y.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.

Wire Cloth.

Barnum, E. T., Detroit, Mich.
Clinton Wire Cloth Co., Clinton, Mass.
Darby, Edward & Sons, Philadelphia.
Estey, W. S., 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co., 42 Cliff, N. Y.
Howard & Morse, 45 Fulton, N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
W. S. Tyler Wire Works Co., Cleveland.

Wire Cutters.

Higginum Hdw. Co., Higginum, Conn.
King, J. M. & Co., Watertown, N. Y.

Wire Dies.

McFarland, Wm., Trenton, N. J.
Newton & Shipman, 83 John St., N. Y.

Wire Fences, See Fencing, Iron and Wire.

Wire Goods, Manufacturers of.

Bromwell Brush & Wire Goods Co., Cincinnati, Ohio.
Darby, Edward & Sons, Phila.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Ludlow-Saylor Wire Co., St. Louis.
Ossawan Mills Co., Norwich, Conn.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Williamson, C. T. Wire Novelty Co., Newark, N. J.

Wire Machinery.

Am. Tool Wks., Cleveland, O.
Manville, E. J. Mch. Co., Waterbury, Ct.
Morgan Construction Co., Worcester, Mass.
Waterbury Mch. Co., Waterbury, Conn.

Wire Straightening and Cutting Machinery.

Adt, John & Son, New Haven, Conn.

Wire Nails.

Bond Nail Co., Raynham, Mass.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
Phillips, Townsend & Co., Phila., Pa.
Salem Wire Nail Co., Salem, O.
Taunton Wire Nail Co., Taunton, Mass.
Whitney, A. E. & Co., New York City.

Wire Rods, Steel.

New Castle Wire Nail Co., New Castle, Pa.
Washburn & Moen Mfg. Co., Worcester, Mass.
Whitney, A. R. & Co., 17 E'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.

Wire Rope, Iron and Steel, Makers.

Broderick & Bascom Rope Co., St. Louis, Mo.
California Wire Works, San Francisco.
Hazard Mfg. Co., Wilkesbarre, Pa.
A. Leschen & Sons Rope Co., St. Louis.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Williamsport Wire Rope Co., Williamsport, Pa.

Wire Rope Machinery.

Kay, J. F., Passaic, N. J.

Wood-Working Machinery.

Fay, J. A. & Co., Cincinnati, O.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
Wilkinson, A. J. & Co., Boston, Mass.

Wrenches, Manufacturers of.

Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings, Spencer & Co., Hartford, Conn.
Joes Wrench Co., Worcester, Mass.
Trimont Mfg. Co., Roxbury, Mass.
Walworth Mfg. Co., Boston, Mass.
Williams, J. H., Brooklyn, N. Y.

Wringers.

Colby Wringer Co., Montpelier.
National Wringer Co., Canton, O.

ALPHABETICAL INDEX TO ADVERTISERS.

Abbott, Wheelock & Co.....	17	Bryan Mfg. Co.....	86	Cross & Speirs Machine Co.....	38	Gurney, F. B.....	65
Alsite Aluminum Co.....	52	Bryden Horse Shoe Co.....	81	Crown Smelting Co.....	3	Haight & Clark.....	24
Acme Shear Co.....	65	Buck Bros.....	65	Crystal Mills Co.....	63	Haines & Zimmermann.....	68
Adt, John & Son.....	37	Buck, Chas.....	64	Cumberland Nail & Iron Co.....	16	Haines Gauge Co.....	24
Atna-Standard Iron & Steel Co.....	19	Buckeye Mfg Co.....	64	Cushman Chuck Co.....	40	Halk & Naumann.....	3
Aiken, Henry.....	25	Buffalo Forge Co.....	98	Dallett, Thos. H. & Co.....	42	Halsey, Jas. T.....	40
Alexander Bros.....	33	Buffalo Scale Co.....	84	Dame, Stoddard & Kendall.....	70	Halsey, W. S. & Co.....	23
Allentown Rolling Mills.....	26	Burden Iron Co.....	81	Dangler Stove & Mfg. Co.....	77	Hamilton Machine Tool Co.....	44
Am. Bolt Co.....	89	Burke, P. F.....	83	Darby, Edw. & Sons.....	8	Hammer & Co.....	84
Am. Metal Co.....	3	Burr & Houston Co.....	22	Deitz, A. E. & Son.....	28	Hardware Board of Trade.....	50
Am. Pig Iron & Storage Warrant Co.....	18	Bussenius & Cunliffe.....	47	Davol, John & Sons.....	2	Harrington, E., Son & Co.....	45
Am. Screw Co.....	12	Butler, C. N.....	6	Dayton Malleable Iron Co.....	98	Harrington & King Perforating Co.....	9
Am. Stamping Co.....	72	Butterfield & Co.....	40	Dean Bros. Steam Pump Works.....	32	Harrison Safety Boiler Wks.....	27
Am. Steel Scraper Co.....	86	Butts & Ordway.....	31	Deitz, A. E.....	77	Hart Mfg. Co.....	40
Am. Tool Co.....	87	Byram & Co.....	24	Deming Co.....	58	Hartford Steam Boiler Insp. and Ins.	
American Tool Works.....	47	C. & C. Electric Co.....	29	Detrick & Harvey Machine Co.....	45	Co.....	29
Ames Sword Co.....	78	Caldwell Mfg. Co.....	78	Detroit Foundry Equipment Co.....	23	Hartley & Graham.....	1
Ansonia Brass & Copper Co.....	2	California Wire Works.....	6	Diamond Clamp & Flask Co.....	28	Haskell, Wm. H. Co.....	90
Arcade File Works.....	62	Cambria Iron Co.....	18	Diamond State Iron Co.....	81	Hazard Mfg. Co.....	6
Arcade Malleable Iron Co.....	21	Cambridge Iron & Steel Co.....	19	Diefenbacher, W. H. & Co.....	69	Heath, S. F. Cycle Co.....	69
Armstrong Bros. Tool Co.....	31	Cambridge Roofing Co.....	14	Dienelt & Eisenhardt.....	37	Heinisch's R. Sons Co.....	65
Armstrong Mfg. Co.....	39	Canfield, H. O.....	34	Dietz, Schumacher & Co.....	38	Henderer, A. L.....	35
Artificial Gas Engineering Co.....	25	Canton Saw Co.....	62	Dille & McGuire Mfg. Co.....	38	Henderson Bros.....	22
Athol Machine Co.....	59	Capewell Horse Nail Co.....	82	Disston, Henry & Sons.....	61	Hendey Machine Co.....	51
Atlas Tack Corporation.....	11	Carbon Steel Co.....	19	Dixon, Jos., Crucible Co.....	34	Hendricks Bros.....	2
Avery Stamping Co.....	70	Carlin's Sons, Thomas.....	47	Dodd, A. W. & Co.....	97	Hendrick Mfg. Co., Ltd.....	7
Ayers, J. R.....	67	Carpenter, J. M. Tap & Die Co.....	97	Donaldson Iron Co.....	22	Hendryx, A. B. Co.....	3
Babcock & Wilcox Co.....	31	Cary Mfg. Co.....	67	Douglas, W. & B.....	58	Henley, M. C.....	88
Baeder, Adamson & Co.....	55	Chadborne & Coldwell Mfg. Co.....	38	Draper Machine Tool Co.....	47	Herrick, J. A.....	26
Banker & White.....	63	Chambers Bros. Co.....	90	Dudgeon, Richard.....	38	Hertz, T. & Son.....	4
Bardsley, J.....	84	Champion Blower & Forge Co.....	40	Dunbar Bros.....	5	Higginum Hdw. Co.....	77
Barns, C. K. & Co.....	21	Champion Iron Co.....	7	Dunham Nut Co.....	39	Hillebrand & Wolf.....	35
Barnes, W. F. & John.....	36	Chapman Valve Mfg. Co.....	28	Dupont Mfg. Co.....	35	Hill, Clarke & Co.....	48
Barnett, G. & H.....	63	Chatillon, John & Sons.....	72	Durant, W. N.....	33	Hobson, F., Seaman & Co.....	17
Barnum, E. T.....	8	Cheney, S. & Son.....	22	Dwight Slate Machine Co.....	39	Hoffman, C. & A.....	64
Bass Foundry & Machine Works.....	27	Chest Bros.....	22	Eagle Anvil Works.....	62	Hoffman, J. W. & Co.....	16
Bay State Stamping Co.....	43	Chester Steel Casting Co.....	23	Eagle Bicycle Mfg. Co.....	97	Hogan, John L. & Co.....	16
Bellevue Pump Co.....	59	Chicago Spring Butt Co.....	77	East Chicago Foundry Co.....	21	Hoggson & Pettis Mfg. Co.....	60
Bement, Miles & Co.....	37	Chrome Steel Works.....	18	Eccles, Richard.....	79	Hollands Mfg. Co.....	59
Bemis & Call Hardware & Tool Co.....	84	Church, Isaac.....	90	Eddy Electric Mfg. Co.....	22	Holmes & Edwards Silver Co.....	66
Benbow Mfg. Co.....	73	Cincinnati Corrugating Co.....	14	Enterprise Mfg. Co. of Pa.....	73	Hooker-Colville Steam Pump Co.....	48
Berger Bros.....	72	Claffen Mfg. Co.....	34	Erie Engine Works.....	28	Houston, C. B. & Co.....	16
Berlin Iron Bridge Co.....	10	Clapp, Geo. M.....	48	Estey, W. S.....	6	Howard Iron Works.....	77
Best, Fox & Co.....	3	Clark, G. P.....	48 & 47	Ette & Henger Mfg. Co.....	87	Howard & Morse.....	7
Bethlehem Iron Co.....	21	Clark & Cowles.....	48 & 48	Etting, Edw. J.....	16	Howson & Howson.....	6
Bevin Bros. Mfg. Co.....	68	Clarke, Thomas.....	89	Eureka Cast Steel Co.....	98	Hudson, C. E. & Co.....	58
Bickford Drill & Tool Co.....	44	Clement & Dunbar.....	57	Evans-Friction Cone Co.....	3	Hurlbut-Rogers Mch. Co.....	41
Bicycle Step Ladder Co.....	74	Clendenin Bros.....	13	Eynon-Evans Mfg. Co.....	29	Hurley Bros.....	63
Bigelow, C. R.....	48	Cleveland Block Co.....	74	F. & N. Mfg. Co.....	88	Ideal Machine Works.....	52
Bignall & Keeler Mfg. Co.....	37	Cleveland City Forge & Iron Co.....	1	Fairmount Machine Co.....	45	Ideal Mfg. Co.....	68
Billings & Spencer Co.....	84	Cleveland Fence Co.....	9	Fay, J. A. & Co.....	34	Illinois Pure Aluminum Co.....	77
Bingham, W. Co.....	68	Cleveland Rubber Works.....	70	Fearing, Wm. S.....	2	Indiana Wire Fence Co.....	7
Birmingham Iron Foundry.....	28	Cleveland Stamping & Tool Co.....	74	Fitch, W. & E. T.....	97	Ives, H. B. & Co.....	78
Bishop, A. W.....	77	Cleveland Stone Co.....	43	Fitchburg Machine Works.....	33	Jacobus, W. H.....	90
Bissell, E. Son & Co.....	51	Cleveland Twist Drill Co.....	42	Fitzsimons & Co.....	16	Jarecki Mfg. Co.....	39
Blair Mfg. Co.....	87	Clinton Wire Cloth Co.....	8	Flagg, Stanley G. & Co.....	98	Jeffrey Mfg. Co.....	33
Blake & Johnson.....	13	Cobb & Drew.....	13	Foos Mfg. Co.....	36	Jenkins Bros.....	1
Bliss Co., E. W.....	35	Coburn Trolley Track Mfg. Co.....	76	Fraim, E. T.....	78	Jenkins & Lingle.....	36
Boardman, L. & Son.....	65	Coes, Loring & Co.....	85	Frankford Steel Co.....	18	Jenner, H. W. T.....	6
Boker, Hermann & Co.....	17	Coffin & Leighton.....	39	Franklin, H. H. Mfg. Co.....	48	Jessop, Wm. & Sons.....	17
Bommer Bros.....	52	Colburn, A. M.....	40	Frasse Co.....	56	Johns, H. W. Mfg. Co.....	14
Bond Nail Co.....	13	Colby Wringer Co.....	72	Frost Thill Spring Co.....	83	Johnson, I. H., Jr., & Co.....	44
Boone, W. C. Mfg. Co.....	23	Coldwell Lawn Mower Co.....	85	Fulton Iron & Engine Works.....	44	Johnson, S. C.....	75
Booth, The Lloyd Co.....	24	Conroy, P. J. & Co.....	83	Gardner, Jas. & Son.....	24	Jones, B. M. & Co.....	19
Borden & Lovell.....	8	Continental Iron Works.....	27	Garrison, A., Foundry Co.....	24	Jones, M. D. & Co.....	77
Bergner, Cyrus.....	24	Corbin, P. & F.....	76	Garry Iron & Steel Rfg. Co.....	11	Jones & Lamson Machine Co.....	54
Boston Gear Works.....	27	Corning, Edw. & Co.....	15	Garland Foundry Co.....	21	Jones, Jesse & Co.....	60
Bourke Mfg. Co.....	58	Correspondence School of Mechanics.....	55	Garvin Machine Co.....	43	Kanneberg Roofing Co.....	9
Box, Alfred & Co.....	46	Cotton, Barclay W. & Co.....	15	Gautier Steel Department.....	14	Kay, J. F.....	4
Boyce Rivet Co.....	98	Covert Mfg. Co.....	81	Gaylord, F. L. Co.....	3	Kayser, Ellison & Co.....	17
Bradlee & Co.....	15	Covert's Saddlery Works.....	55	Gibbs Mfg. Co.....	88	Keeley, Jerome & Co.....	16
Brass Goods Mfg. Co.....	2	Cox, Justice, Jr.....	16	Gilbert & Bennett Mfg. Co.....	8	Kelley & McBean.....	68
Bridgeport Gun Implement Co.....	42	Cramp, Wm. & Sons S. & E. B. Co.....	3	Glazier Stove Co.....	55	Kennedy, Julian.....	25
Bridgeport Mch. Tool Works.....	46	Crawford Mfg. Co.....	69	Goddard, Asa.....	31	Keuffel & Esser Co.....	59
Bridges, Marvin.....	48	Crescent Horse Shoe & Iron Co.....	83	Goodell Co.....	66	Keys, W. W. & R. M. Co.....	3
Bristol Co.....	1	Crescent Phosphorized Metal Co.....	3	Goubert Mfg. Co.....	31	Keystone Clutch & Machine Works.....	40
Britton, Horace E.....	67	Crescent Steel Co.....	18	Gould & Eberhardt.....	33	Kilbourne & Jacobs Mfg. Co.....	86
Britton, J. Blodgett.....	26	Cresson, Geo. V. Co.....	41	Graham, John H. & Co.....	75	Kilmer Mfg. Co.....	1
Broderick & Bascom Rope Co.....	6	Croissant, M.....	75	Grand Crossing Tack Co.....	11	King & Andrews.....	52
Bromwell Brush & Wire Goods Co.....	11 & 57	Crosby, G. A. & Co.....	36	Grand Rapids Cycle Co.....	68	King, J. M. & Co.....	63
Bronson Supply Co.....	72			Green, A. H.....	89	Knapp & Cowles Mfg. Co.....	64
Brown, E. E. & Co.....	79					Kohler, F. F. & Co.....	87
Brown Holsting & Conveying Mch. Co.....	33						
Brown, R. H. & Co.....	56						

Kreischer, B. & Sons.....	24	New Haven Mfg Co	38	Ripley Mfg. Co.....	69	Talcott, W. O.....	34
Krogstrup, W.....	60	New Haven Wire Mfg. Co.....	6	Riverside Iron Works.....	19	Taunton Locomotive Mfg. Co.....	29
La Belle Steel Co.....	20	N. J. Wire Cloth Co.....	8	Roberts, A. & P. & Co.....	18	Taunton Wire Nail Co.....	7
Lafin & Rand Powder Co.....	22	New Process Twist Drill Co.....	42	Roberts Mfg. Co.....	33	Thomson, W. H. & Co.....	16
Lake, J. H. & D. Co.....	40	Newton & Shipman.....	17	Robertson, E. C.....	52	Tiebout, W. & J.....	79
Lane Brothers.....	78	N. Y. Belting & Packing Co.....	34	Robinson-Rea Mfg. Co.....	23	Tilghman's Pat. Sand Blast Co., Ltd.	25
Lansing Wheelbarrow Co.....	86	N. Y. Gas Saving Co.....	56	Rogers, The Wm. Mfg. Co.....	66	Titchener, E. H. & Co.....	7
Laughlin, Alex. & Co.....	25	N. Y. Mallet & Handle Works.....	39	Rollason Gas Engines.....	28	Tod, Wm. & Co.....	27
Lea, J. Tatnall & Co.....	20	N. Y. Powder Co.....	22	Rome Brass & Copper Co.....	2	Toledo Metal Wheel Co.....	63
Lean, D. R. Co.....	26	N. Y. Iron Roofing & Corrugating Co.	11	Rowland, Wm. & Harvey.....	98	Toomey, Frank.....	48
League Cycle Co.....	97	Nicholson File Co.....	63	Russell, Burdsall & Ward.....	98	Toplift & Ely Co.....	85
Le Count, C. W.....	83	Nicolls, Wheeler & Co.....	15	Russia Cement Co.....	57	Torrey, J. R. Razor Co.....	65
Leechburg Foundry & Machine Co...	22	Niles Tool Works.....	49	St. Louis Bronze & Aluminum Works	3	Totten & Hogg Iron and Steel Fdry.	
Leong's, Jno. S. Son & Co.....	98	North Bros. Mfg Co.....	18 & 55	Sabin Machine Co.....	5	Co.....	27
Leonard, B. E.....	85	Northampton Cutlery Co.....	66	Salem Wire Nail Co.....	13	Townsend, W. P. & Co.....	90
Leonard, J.....	21	Northampton Emery Wheel Co.....	43	Samson Cordage Works.....	1	Trenton Iron Co.....	4
Leschen, A. & Sons Rope Co.....	6	Norton Bros.....	79	Samuel, Frank.....	15	Trethewey Mfg. Co.....	25
Levis, Henry & Co.....	21	Norton Emery Wheel Co.....	43	Saunders's Sons, D.....	38	Tramont Mfg. Co.....	84
Lidgerwood Mfg. Co.....	98	Norton & Jones Machine Tool Works.	40	Sawyer, O. C.....	86	Tyler Wire Works Co. W. S.....	54
Lindsay, Jas. G. & Co.....	16	Norwalk Iron Works Co.....	32	Scattergood, H. W.....	52	Union Mfg. Co.....	41
Link-Belt Engineering Co.....	36	Nubian Iron Enamel Co.....	29	Scheeler & Sons.....	5	Union Metallic Cartridge Co.....	1
Lockhart Iron & Steel Co.....	20	Obermayer, S. Co.....	21	Schneider & Trenkamp Co.....	73	U. S. Projectile Co.....	38
Lovell, Jno. P. Arms Co.....	68	Ogden & Wallace.....	21	Schultze Mfg. Co	78	Valentine, M. D. & Bro.....	24
Lovegrove & Co.....	48	Old Dominion Iron & Nail Works Co.	83	Scott, Geo. M.....	33	Valley Pump Works.....	32
Loyd, John.....	62	Ossawan Mills Co.....	97	Scoville Mfg. Co.....	2	Valley Steel Co.....	1
Ludlow-Saylor Wire Co.....	7	Ostrander Fire Brick Co.....	24	Scranton & Co.....	36	Van Dorn Iron Works Co.....	7
Lufkin Rule Co.....	74	Ostrander, W. R. & Co.....	59	Scranton Forging Co.....	31	Van Wagoner & Williams Hdw. Co.	98
Lukens Iron & Steel Co.....	15	Otto Gas Engine Works.....	30	Scranton Supply & Machine Co.....	47	Victor Mfg. Co.....	79
Lundberg, Gustaf.....	17	Oxford Iron & Nail Co.....	13	Seaman, Sleeth & Black.....	22	Vulcan Iron Works.....	31
Lunkenheimer Co.....	28	Packer, C. W.....	55	Sebastian Lathe Co.....	49	Walbridge & Co.....	77
McCabe, J. J.....	47	Palmer & De Mooy.....	23	Sellers, Wm. & Co.....	45	Wallace Wm. H. & Co.....	21
McCaffrey File Co	63	Palmer Hardware Mfg. Co.....	56	Seneca Falls Mfg. Co.....	44 & 60	Walworth Mfg. Co.....	97
McClure, Amsler & Co.....	26	Pancoast Henry B. & Co.....	39	Sessions Foundry Co.....	23	Wardlow, S. & C.....	17
McCoy, Jos. F. & Co.....	43	Passaic Rolling Mill Co.....	21	Seyfert's Sons, L. F	47	Washburn & Moen Mfg. Co.....	4
McFarland, Wm.....	4	Peabody & Parks.....	72	Shipley, A. B. & Son	65	Waterbury Brass Co.....	2
McGowan, J. H. & Co.....	32 & 85	Peck, A. G. & Co.....	98	Shoenberger & Co.....	80	Waterbury Farrel Foundry & Ma-	
McIlvain, Wm. & Sons.....	26	Pennsylvania Bolt & Nut Co.....	89	Shultz Belting Co.....	1	chine Co.....	32
McKay, Jas. & Co	16	Penna. Diamond Drill & Mfg. Co...	25	Sickels, Sweet & Lyon.....	65	Waterbury Machine Co.....	41
McKinney Mfg. Co.....	76	Pennsylvania Mch. Co.....	47	Sidney Steel Scraper Co	87	Watson & Stillman.....	38
McKinnon Dash & Hdw. Co.....	79	Perry, W. H. & Co.....	47	Sigourney Tool Co.....	39	Webster, Warren & Co.....	28
McLean, John.....	27	Perry & Whipple Co	79	"Silver Finish".....	9	Wellman Iron & Steel Co.....	15
McLeod & Henry Co.....	24	Philadelphia Drop Forge Co.....	24	Silver Mfg. Co.....	31	Wells Bros. & Co.....	41
McNab & Harlin Mfg. Co.....	27	Philadelphia Engineering Wks.....	26	Simonds Mfg. Co.....	60	Western Foundry Co.....	24
Machinists' Supply Co.....	48	Philadelphia Lawn Mower Co.....	89	Singer, Nimick & Co.....	20	Wetherell Bros.....	17 & 20
Mackey, James T.....	2	Phillips, A. J. & Co.....	64, 73, 75, 78, 87 & 89	Smith & Egge Mfg. Co.....	43	Wetherhill, Robt. & Co.....	97
Mahoning Valley Iron Co.....	21	Phillips, Townsend & Co.....	13	Smith, H. D. & Co.....	83	Wharton, J. S. Lovering	57
Main Belting Co.....	34	Phoenix Horseshoe Co.....	81	Smith, J. D. Foundry Supply Co.....	23	White, A. A. & Co.....	60
Manning, Maxwell & Moore	42	Phoenix Iron Co.....	15	Smythe, S. R. Co, Inc.....	25	White, L. & I. J. Co.....	65
Manville Machine Co., E. J.....	46	Phosphor Bronze Smelting Co.....	3	Solomon, Jno. M.....	23	White Mt. Freezer Co.....	55
Mansfield, H. H.....	48	Pierson & Co.....	18	Sommer's Son, John.....	98	White, Van Glahn & Co.....	64
Maris & Beekley.....	45	Pike Mfg. Co.....	64	Southwark Foundry & Machine Co.	28	Whitlock Coil Pipe Co.....	30
Maslin, J. & Son.....	32	Pilling & Crane.....	16	Specialty Mfg. Co.....	67	Whitney, A. R. & Co.....	18
Mast, Foss & Co.....	57	Pittsburgh I. & S. Eng. Co.....	26	Speidel, J. G.....	45	Whitton, D. E. Mch. Co.....	40
Matthiessen & Hegeler Zinc Co.....	2	Pittsburgh Mfg. Co.....	33	Spencer's I. S. Sons.....	24	Wickes Bros.....	49
Maurer, H. & Son	24	Pittsburgh Reduction Co.....	54	Standard Fdry. & Mfg. Co.....	22	Wickwire Bros.....	7
Mayhew, H. H. Co	64	Place, Geo.....	47	Standard Horse Shoe Co.....	81	Wilcox & Howe Co.....	79
Merrill Bros.....	25	Plumb, Fayette R.....	67	Standard Lighting Co.....	69	Wiley & Russell Mfg. Co.....	39 & 98
Merrill Mfg. Co.....	38	Piume & Atwood Mfg. Co.....	2 & 73	Standard Tool Co.....	42	Williams, J. H. & Co.....	34
Miles, F. S.....	9	Pollock, W. B. & Co.....	27	Stanley Rule & Level Co.....	97	Wilkinson, A. J. & Co.....	59
Miller & Van Winkle.....	4	Poole, Robt. & Son Co.....	31	Stanley Works.....	78	Williamson, C. T. Wire Nov. Co.....	97
Millers Falls Co.....	56 & 98	Pope Mfg. Co.....	55	Star Mfg. Co.....	85	Williamsport Wire Rope Co.....	6
Milne, A. & Co.....	18	Poppling, J.....	52	Stark Mch. & Tool Co.....	36	Wilmot & Hobbs Mfg. Co.....	1 & 98
Milton Mfg. Co.....	39	Port Chester Bolt & Nut Co.....	89	Starrett, L. S.....	59	Wilson, E. H. & Co.....	18
Miner & Peck Mfg. Co.....	37	Portland Lawn Sprinkler Co	87	Steam Gauge & Lantern Co.....	72	Wilson, John.....	64
Missouri Metal Co.....	2	Pottstown Iron Co.....	18	Stearns, E. C. & Co.....	54 & 78	Wilson, J. Fred.....	90
Mohr, J. J.....	16	Pottsville Iron & Steel Co.....	15	Steptoe, J. & Co.....	48	Wilson, W. A.....	37
Monarch Cycle Co.....	69	Powell Planer Co.....	48	Sterling Cycle Works.....	68	Winslow, Sam'l, Skate Mfg. Co.....	70
Monce, S. G.....	73	Pratt & Cady Co.....	97	Sternbergh, J. H. & Son.....	90	Wister, Francis.....	16
Montour Iron & Steel Co.....	21	Pratt & Whitney Co.....	41	Stevens Arms & Tool Co.....	74	Wister, L. & R. & Co.....	51
Moore, Dr. Gideon E.....	54	Prentiss Tool & Supply Co.....	47	Steward & Romaine Mfg. Co., Ltd.	86	Wolcott & West.....	22
Moore Mfg. & Foundry Co.....	45	Prentiss Vise Co.....	78	Stiles & Parker Press Co.....	35	Wolff, R. H. & Co. Ltd.....	5
Moore & White Co.....	41	Pullman Sash Balance Co.....	65	Stirling Co.....	30	Wollensak, J. F.....	58, 60 & 79
Moorhead-McCleave Co.....	20	Putnam Nail Co.....	82	Stocking, E. B.....	6	Wood Alan & Co.....	18
Morgan Construction Co.....	4	Quint, A. D.....	38	Stokes Mfg. Co.....	68	Wood, R. D. & Co.....	23
Morgan Spring Co.....	4	Rainey, W. J.....	1	Storm Mfg. Co.....	58	Wood, W. Dewees Co.....	20
Morrison, Robert.....	28	Rand Drill Co.....	31	Stover Mfg. Co.....	78	Worcester Moh. Screw Co.....	90
Morse Twist Drill & Machine Co.....	43	Randolph & Clowes	1	Stow Flexible Shaft Co.....	42	Worthington, Henry R.....	32
Morse, Williams & Co.....	45	Read, Wm. & Sons.....	97	Stow Mfg. Co.....	42	Wright & Colton Wire Cloth Co.....	8
Morton, Thos.....	84	Reading Hardware Co.....	77	Stuart & Peterson Co.....	73	Wurster, F. W. & Co.....	98
Moseley Iron Bridge & Roof Co.....	11	Reece, Edw. F.....	40	Sturtevant, B. F. Co.....	37	Wyman & Gordon.....	84
Mount Carmel Bolt Co.....	97	Reeves, Paul S.....	98	Sturtevant Mill Co.....	43	Yale & Towne Mfg. Co.....	44 & 57
Myers, F. E. & Bro.....	58	Reynolds & Co.....	11	Superior Steel Co.....	5		
National Horse Nail Co.....	83	R.I. Perkins Horse Shoe Co.....	81	Supplee Hardware Co.....	88		
National Pipe Bending Co.....	30	Rhodes, L. E. Co.....	52	Sweetser, W. A.....	21		
National Saw Co.....	60	Richardson, C. F. & Son.....	60	Swindell, W. & Bros.....	25		
National Wringer Co.....	72	Richards, I. P	97	Taintor Mfg. Co.....	60		
Newark Machine Tool Works.....	54	Ridgway, Craig & Son.....	44	Tablet & Ticket Co.....	52		
New Castle Wire Nail Co.....	13	Riehle Bro Testing Machine Co.....	35				
New Haven Copper Co.....	2						

Published by DAVID WILLIAMS, 96-102
Reade Street, New York. Printed by
THE WILLIAMS PRINTING Co., Gen-
eral Book, Commercial and News-
paper Printers and Binders, 96-100
Reade St., New York.



WHEN IN NEED Address **MOUNT CARMEL BOLT CO.,**
MOUNT CARMEL, CONN.

DIRECTIONS FOR USING
WILLIAMSON'S NEW POWER CORK SCREWS.
KEEP ON TURNING, DO NOT PULL.

No. 1243, Nickel Plated, Apple Wood Handle, \$5.00 per dozen.
1443, " Rosewood 5.50

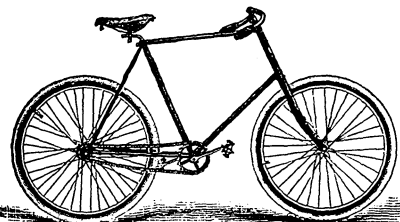
For Discounts and Prices of other styles send for Catalogue.

G. T. WILLIAMSON WIRE NOVELTY CO., NEWARK, N. J.

Manufacturers of Wire Specialties for the Trade.



OUR AGENTS MAKE MONEY.



We Make

Wheels to Sell and

Stay Sold.

THE EAGLE BICYCLE MFG. CO.,

TORRINGTON, CONN.

FIRST AND ONLY
IN THE WORLD TO MAKE

ALUMINUM RIMS AND CLINCHER TIRES.



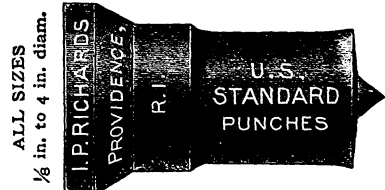
THE PRATT & CADY CO.,

HARTFORD, CONN.

Sash Weights.

WILLIAM A. HARRIS, Selling Agent.

The "DODD'S" LIQUID
Best. CLUE.
It gives Perfect Satisfaction.
A. W. DODD & CO., Gloucester, Mass.



For Punching
IRON AND STEEL.

Mechanics.—The Technical Student's Introduction to. Being a series of Practical Papers showing the leading Principles of Physical Science, Exemplified in the Properties of Bodies or Materials; the laws which Regulate the Phenomena of Motion, of Heat, of the Atmosphere, of Water at Rest and in Motion, etc., etc., as applied to the Practical Work of the Architect and Builder, the Engineer and Machinist, and the General Artisan engaged in the Designing and Construction of Machines, Tools, and Appliances Useful in the Industrial Arts. By Various Writers. Edited by Robert Scott Burn. About 150 illustrations, \$2.00

For sale by David Williams. 96-102 Reade St., N. Y.

BOOKS. YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS, Publisher** and bookseller, 96-102 Reade St., New York

WALWORTH MFG. CO., - Boston, Mass.,

MANUFACTURERS OF

Tools for cutting and threading **Wrought Iron Pipe,**

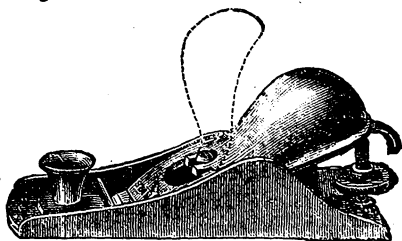
DIE PLATES AND DIES,

STILLSON PIPE WRENCH, Miller's Ratchet Die Plate, Brass and Iron Valves and Cocks, Wrought Iron Pipe and General Machinists' Supplies.

IMPROVED
Labor-Saving
CARPENTERS'
TOOLS.
STANLEY
RULE & LEVEL CO.
New Britain, Conn.

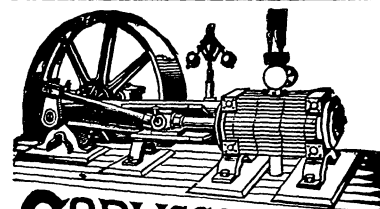
SOLD BY ALL
Hardware Dealers.

Stanley's Knuckle-Joint Block Plane.



The knuckle-joint in the cap makes it a lever, too; and the act of placing the cap in position, will also clamp the cutter securely in its seat.

No. 18. Knuckle-Joint Plane, 6 in. Length, 1 3/4 in. Cutter, Lateral Adjustment, Nickel Plated Trimmings. \$1.75



CORLISS ENGINES
MACHINISTS
IRON FOUNDERS, BOILER MAKERS,
ROBT. WETHERILL & CO.
CHESTER, PA.

Look ! Look !!

1894 MODEL BICYCLES

FOR HARDWARE TRADE.



New 1894 Model **NEW MAIL.** Highest Grade, 10 years' reputation. Also **BEST LINE** cheap and medium grade wheels in the market. Address

WM. READ & SONS,

107 WASHINGTON ST., - **BOSTON.**

ESTABLISHED 1826.

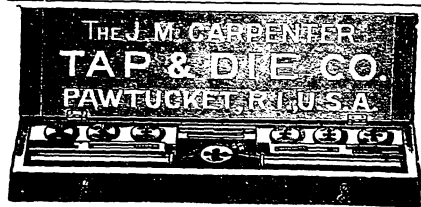
MUST SECURE AGENCY NOW!!!



CROWN and GIANT BRAIDED

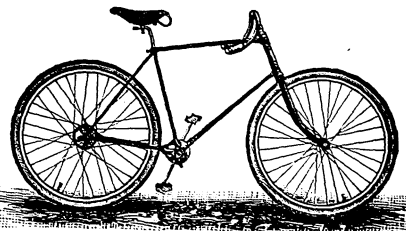
Sash Cords, Bell Cords, Mason's Lines, Clothes Lines, Bright Wire Goods, Picture Wire Nails, Knobs and Hooks, Brass Chain, Spool Wire, Etc.

OSSAWAN MILLS CO.,
Norwich, Conn., U. S. A.



SECURE AGENCY NOW.

The League Chainless Safety
MARKS A NEW ERA.



—SEND FOR CATALOGUE.—

THE LEAGUE CYCLE COMPANY,
Hartford, Ct.

THE W. & E. T. FITCH CO.,
NEW HAVEN, CONN.
Manufacturers of a variety of
HARNESS SNAPS.



PAUL S. REEVES,
Philadelphia.
Phosphor Bronze
AND
BABBITT METALS.
Lead Lined Car Bearings a Specialty.

Brass and Phosphor Bronze Castings from $\frac{1}{4}$ pound to 20,000 pounds in weight.

BUFFALO ELECTRIC, STEAM AND PULLEY TYPES, GREATEST AIR VOLUME, LEAST POWER

VENTILATING FANS

BUFFALO FORGE CO.
BUFFALO, N.Y. U.S.A.

BUFFALO FAN SYSTEM
OF HEATING AND VENTILATING
ALL LARGE BUILDINGS.

BUFFALO FORGE CO. BUFFALO, N.Y. U.S.A.

NORWAY IRON RIVETS.
FOR ALL PURPOSES.
WRITE FOR PRICES TO
THE BOYCE RIVET CO.
MUNCIE, INDIANA.

THE DIAMOND
BRASS DOWEL PIN AND
WOOD FILLET.
MANUFACTURED BY
THE D.C. & F. CO.
BIRMINGHAM, U.S.A.

STEEL TUBES
WELDLESS
JOHN S. LENG'S SON & CO., NEW YORK.

DAYTON
MALLEABLE
IRON CO.
DAYTON, O.
HIGH CLASS
CASTINGS A SPECIALTY.

EXPERIMENTAL ELECTRICITY.

By EDWARD TREVERT.

Illustrated. - Cloth. - \$1.00.

CONTENTS—Some Easy Experiments in Electricity and Magnetism; How to Make Electric Batteries; A Galvanometer; An Induction Coil; An Electric Bell; A Magneto Machine; A Telegraph Instrument; An Electric Motor; A Dynamo; Electric Bell Fitting and Gas Lighting; Electric Lamps; Electric Terms.

Sent postpaid on receipt of price by
DAVID WILLIAMS, Publisher & Bookseller,
96-102 Reade Street. New York

STANLEY G. FLAGG & CO., Philadelphia, Pa.
Office and Works, N. W. Cor. 19th St. & Pennsylvania Ave.
Manufacturers of **STEEL CASTINGS,**
A Substitute for Steel and Wrought Forgings.
Circulars Sent on Application.

ROLLER JACK SCREW.

See Page 56.

MILLERS FALLS CO.,
93 Reade St., New York.

EUREKA CAST STEEL COMPANY.
Office and Works, Chester, Pa.
Open Hearth, Crucible and Eureka Steel Castings.
Railroad and Machine Castings.
Locomotive Cross-Heads and Gearing a Specialty.
Guaranteed Knuckles for M. C. B. Couplers.

SPRINGS AND AXLES
ROLLING MILL.
F. W. WURSTER & CO.
375 Kent Ave. Brooklyn N.Y.

New Full Mounted
Lighting Screw
Plate.
Send for Catalogue



WILEY & RUSSELL MFG. CO., - Greenfield, Mass.

LIDGERWOOD
HOISTING ENGINES.
300 styles and sizes. Over 10,000 in use.
LIDGERWOOD MFG. CO., 96 Liberty St., N. Y.

ESTABLISHED
Spring Making, 1842. Steel Making, 1845.
Norway Iron, 1871 (Re-Rolled).

WM. & HARVEY ROWLAND,
MANUFACTURERS OF
Springs, Steel, Re-Rolled Norway
Iron & Slit Norway Nail Rods.
Address FRANKFORD P. O., PHILADELPHIA.



A. G. PECK & CO.
Cohoes, N. Y.
MANUFACTURERS OF
AXES, ADZES,
BROAD AXES,
HATCHETS.

Send for Catalogue
and Price List.



THIS IS THE TIME TO BUY
Lemon Squeezers

WRITE FOR PRICES TO
JOHN SOMMER'S SON,
355-365 Central Ave., Newark, N. J.

RUSSELL, BURDSALL & WARD,
Portchester, N. Y.,
Manufacturers of
Carriage, Tire, Plow and Stove
BOLTS

Carriage Bolts made from Best Square Iron a Specialty.

The Wilmot & Hobbs Mfg. Co.,
MAIN OFFICE, MILLS AND FACTORIES AT
BRIDGEPORT, CONN.
STORE, 20 MURRAY ST., NEW YORK.
(CONNECTED BY TELEPHONE.)

Annual Capacity 15,000 tons. Annual Capacity 30,000 tons.

BESSEMER, OPEN HEARTH,
and the Celebrated and Unequaled
"SWEDOH"
(REGISTERED TRADE-MARK.)

Sheet, Band and Strip Steel.

HOT ROLLED in lots of a few tons or more of a size, and in widths varying from one inch to eight inches or thereabouts by about 1-16 inch and in thickness No. 21 Stubb's Gauge (about 1.32 inch) and thicker for the narrower widths and proportionally thin for the wider sizes, and with plain blue, annealed or pickled finishes.

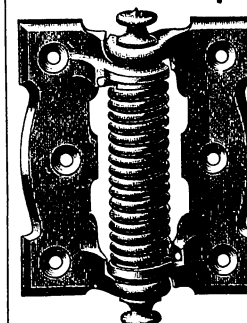
COLD ROLLED Especially to order in lots of a ton or more of a size, with round edges in any of the regular Hot Rolled Steel stock widths up to 15 inches (other widths furnished at our option with round edges or one or two sheared edges; unless ordered differently), and in thickness No. 33 Stubb's Gauge (less than 1.100 inch) and thicker, depending upon the width, up to about No. 6 Stubb's Gauge (about 2.10 inch) and with any quality of surface or degree of stiffness or ductility, as follows:

Tabulated Code of Initials used in describing degree of Smoothness of Surface and Ductility of Cold Rolled Steel.

For more complete description of any one of these qualities of finish send for our new Steel Department Pamphlet.	"EXTRA SOFT" DRAWING STEEL.	"SOFT" BRIGHT DRAWING STEEL.	"HALF HARD" BRIGHT BENDING STEEL.	"HARD" BRIGHT BENDING STEEL.	"EXTRA HARD" BRIGHT STEEL.
"Fairly Smooth" Surface.	A. F.	B. F.	C. F.	D. F.	NONE MADE.
"Good Smooth" Surface.	A. G.	B. G.	C. G.	D. G.	E. G.
"Best Smooth" Surface.	A. B.	B. B.	C. B.	D. B.	E. B.

Used for all Pressed, Stamped and Drawn Work. Easily Brass, Copper, Bronze or Nickel Plated, Tinned or Japanned.

Columbia Spring Hinges



FOR
**Screen
Doors.**

Cast Iron,
Japanned.

These Hinges are very simple in construction. They are packed flat, with the tension of the Springs adjusted, and are "ready for business" as soon as attached to the door.

Having no small or loose parts, they cannot get out of order. They are reversible and can be used on either Right or Left Hand Doors.

No. 14, 3 x 2 1/4, Japanned.
1 Dozen pairs in a box. 1/2 Gross pairs in a case.
THE CHEAPEST AND BEST SPRINGS IN THE MARKET. SEND FOR PRICES.

MANUFACTURED BY
VAN WAGONER & WILLIAMS HDW. CO.,
Cleveland, Ohio, and 14 Warren Street, New York.

THE IRON AGE

THURSDAY, APRIL 12, 1894.

Niagara Falls Inverted Geyelin-Jonval Turbines.

BY EMILE GEYELIN, PHILADELPHIA.

The firm of R. D. Wood & Co., Philadelphia, started last month the Niagara Falls Paper Company's three tur-

to be taken to three horizontal shafts, each shaft to make 200 revolutions per minute when doing full duty.

The first consideration was to group six turbines into as small a pit as possible so as to occupy minimum space, allowing only for the proper water ways in addition to the turbine casings and hydraulic gates; it being well understood that every square foot of pit thus

distances apart of the horizontal shafts were also stipulated. Had it been otherwise, it would have been a comparatively easy matter to have grouped the three wheels under contract around one pen stock. It will be seen hereafter how this difficulty of meeting the specific requirements was met.

As to the pen stock, we have a given quantity of water to bring to the tur-

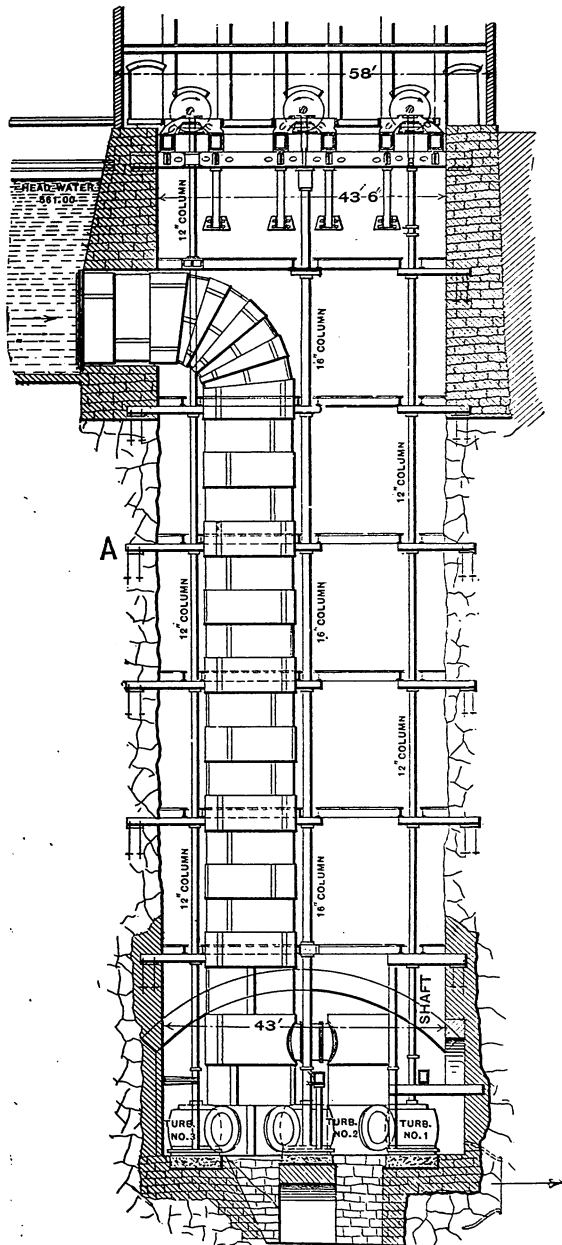


Fig. 1.

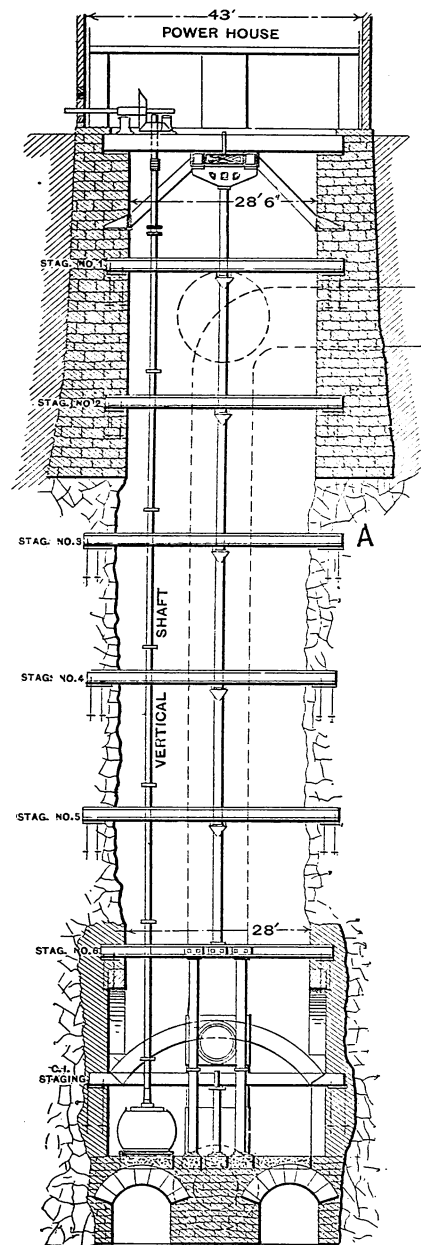


Fig. 2.

Sectional Elevations at Right Angles with Each Other.

NIAGARA FALLS INVERTED GEYELIN-JONVAL TURBINES.

bines, the first hydraulic motors discharging into the great Niagara tunnel. These turbines are each of 1100 horse-power under 140 feet fall. According to the contract under which they were built the planning of the wheel pit with the superstructure to hold the turbine shafts was to be such as to be able to place three additional turbines in the same pit. It was further stipulated that the motions of the three turbines were

saved not only reduced the cost of blasting the pit for the whole depth of 156 feet out of the solid rock, but it also reduced the length of the numerous girders and girder frames which became necessary to steady the bearings of the turbine shafts. By the direction of A. B. Tower, engineer of the Niagara Falls Paper Company, the three first turbines were not only to transmit the motion on the same side of the pit, but the

bine casings in the most effective manner. As designed ultimately, that amount of water is to supply four turbines of 1100 horse-power each, leaving for the future to supply pen stock capacity only for two more turbines. By simple calculation, taking the number of horse-power and the amount of fall, it is readily seen that with an efficiency of 80 per cent, it will require 5186 cubic feet of water per minute for each tur-

bine—in other words, this pen stock was to be so proportioned as to bring in a most efficient manner 20,704 cubic feet of water per minute to the bottom where the turbines are located. Assuming this speed at which the water was to travel to be 145 feet per minute, gave us a diameter of 13 feet 6 inches for this pen stock. The turbines, according to the calculation, required to be 4 feet 6 inches diameter; but, with the view of meeting what I judged to be the necessary diameter of the driving bevel wheel, this diameter was increased to 4 feet 8 inches and thereby a speed of 260 revolutions was attained when the turbine was doing full duty. The casing of the turbines became 8 feet in diameter to allow sufficient waterways around the guide wheel and hood as it approaches the turbine proper. With these main dimensions it became possible to bring distances between the center of the pen stock and those of the turbine to 13 feet 6 inches as a minimum; this enabled us, by placing the four inlets at an angle of 45° to the main inlet, to make 28 feet as the minimum width of the wheel pit. The length of the pit was controlled by the given space between the three horizontal shafts (33 feet), which brought it to 43 feet, Fig. 1.

Returning now to the bottom of the pen stock, as provision was to be made to meet the ultimate condition for supplying four turbines, it became necessary to provide four openings, each of 66 inches in diameter—namely, sufficient to admit advantageously the necessary quantity of water to each turbine. As these openings had, however, to be distributed on the whole periphery, it gave but two openings on each side, which served to supply turbine No. 1 and No. 2, Figs. 1, 2 and 3. It was deemed unsafe to provide a fifth opening on the same plane to supply turbine No. 3, although the iron was made $\frac{1}{4}$ inch in thickness in the pen stock. To meet the difficulty the fifth opening was provided 13 feet higher, which thence joined the truncated section of the future additional pen stock of 9 feet in diameter, to which the third turbine is attached.

As to the turbines and their component parts, I early saw the great advantage of adopting the inverted plan whereby the great weight of the shafts and gears would be to a large extent counterbalanced by the upward pressure. Two main features in the turbines required special attention—namely, the movable and guide wheels had to be so planned as to give the proper speed and power necessary, and the gates and gate motions must be moved quickly up and down by the governors under the pressure of 60 pounds per square inch. Regarding the proper speed of the turbines, I ought to state that it was in part controlled by the bevel wheels which transmit the motion of the horizontal shaft. I judged it unsafe to make a smaller set of bevel wheels than those now in operation and was, therefore, forced to increase the diameter of the movable wheels slightly, which brought the speed of the turbines to 260 revolutions per minute. With the view of obtaining finer lines and a great durability of the movable wheels, the rims were made in bronze. They are 4 feet 8 inches in diameter and have 30 apertures.

Regarding the gate and gate motions, we have adopted the Geyelin Jonval patent gates, which are provided with stout sleeves each weighing 2800 pounds sliding outside the guide wheels to hoods; when closing these sleeves are guided

on by four rods which extend above the turbine casings some 10 feet. There they are united and attached in each case to a yoke which again attaches to a lever. At end of the latter a wire rope is attached which extends to the mill floor above. Passing over a sheave, it drops some 10 feet down, where it is provided with a counter weight which largely counterbalances the gates and rod.

parts—namely, to the section close to the turbines which receive the motion, and to the part close to the bevel pinions, which deliver the motion to the horizontal shafts. In each case we provided heavy cast iron girders; the bottom girder being 30 inches deep and 18 inches broad, supported in the center by two columns. For the upper part near the gears we have for each

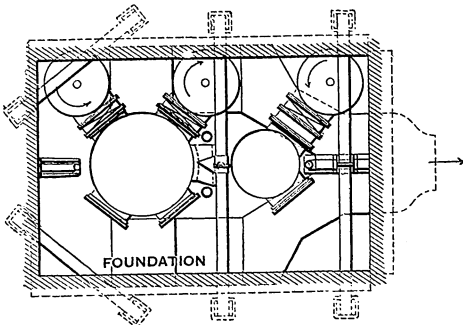


Fig. 3.—Sectional Plan at Turbines.

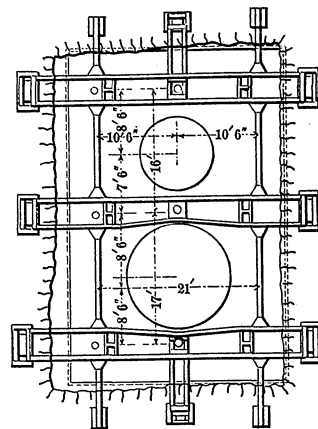


Fig. 4.—Cross Section at A A, Figs. 1 and 2.

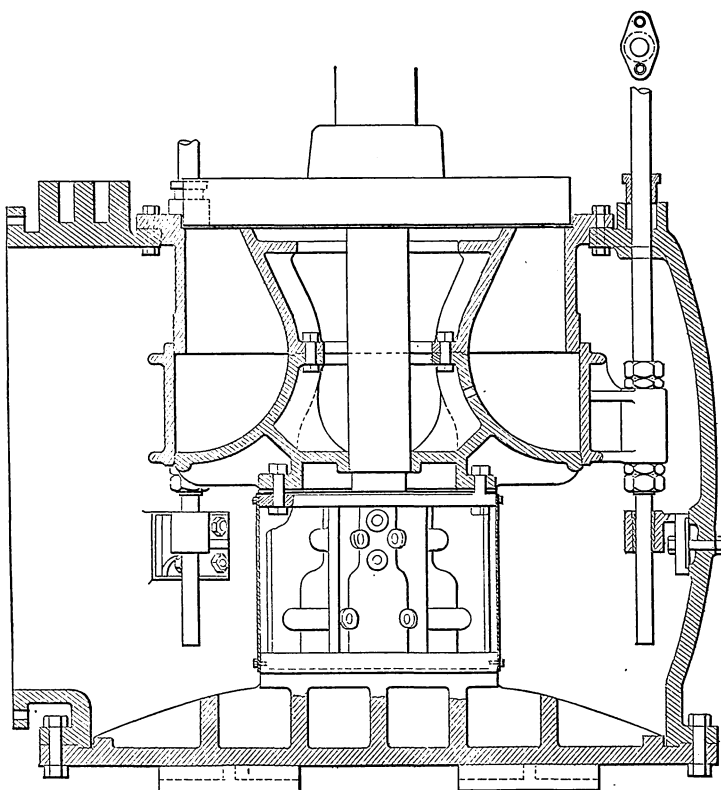


Fig. 5.—Sectional Elevation of Turbine.

NIAGARA FALLS INVERTED GEYELIN-JONVAL TURBINES.

While the steps under the turbine shafts, Fig. 5 are there ready to receive the weight of the turbine, shaft and gears above in case of an accident, yet they are in no way intended to carry any weight while the turbines are in operation. In connection with each step there is below the turbines an adjustable guide bearing lined with lignum vitæ which serves to guide the turbine shafts inside the casings.

In designing the superstructure to firmly hold the upright turbine shaft, special attention was paid to two main

turbine a double harness, being also of cast iron, giving support to two ample bearings. In addition to the above provision to steady the shafts each shaft is provided near the gears with a thrust bearing, intended to support any up or down pressure which occurs in different degrees of gate opening in the turbine while performing duty; thus when the turbine gates are half open the pressure on the bearing is downward, and when full open it is upward.

The most interesting feature connected with this work was the planning

of the gears to transmit the motion to the three line shafts. The given speed of these shafts, 200 revolutions per minute, in connection with an extent of power to be transmitted and the further requirement of an ample surface of bearing, carried the external circumferential speed of these wheels to 4000 feet per minute. The more I studied the problem the more I became convinced that with the certainty of having to meet sudden violent changes amounting to 100 or 200 horsepower, nothing short of mortice wheels would answer. The very fact of having to meet these changes led us to employ comparatively soft material, wood, for the driven gears. This brought about a diameter of the wheels which could not safely be reduced, yet such a circumferential velocity has thus far, to my knowledge, never been attained in gears transmitting large power. I could find no record of any velocity above 2800 feet per minute. Necessity forced me to adopt it, however, and their safety alone would depend on two things—namely, that they should be most firmly held and that the wheel holding the cogs should be strengthened on the outer periphery. The first, that of firmly holding the gears, was accomplished by a most formidable system of interlocked cast iron girders spanning the wheel pit and firmly anchored into the masonry. This frame work, without including the pedestals (four to each pair of wheels) required 270,000 pounds of metal.

By means of a 10-ton traveling crane we have succeeded in erecting this difficult work without accident to the men in charge. Figs. 1 and 2 show the arrangement of girders near the bevel wheels and general view of wheel pit. These wheels have for the past month performed steadily all duties put upon them, and we feel pleased to say that we have successfully created three powerful motors transmitting the motion, as I am aware of, at a velocity before unattained. Under the intelligent supervision of Walter Wood, the engineers of the Camden Works rendered me valuable assistance in proportioning this great work.

Drilling Nickel Steel Armor Plate.—Recently a piece of 12-inch Harveyized nickel steel armor plate, used in the construction of the United States cruiser "Maine," and made by the Bethlehem Iron Company, South Bethlehem, Pa., was sent to the Superior Steel Company of Pittsburgh for the purpose of seeing if that concern could make a tool hard enough to drill it satisfactorily. The drill was made and the test took place last week with satisfactory results. A $\frac{3}{4}$ -inch drill made from Williams nickel tool steel was used, and penetrated the metal easily, and with very little friction upon the tool, it not being more than lukewarm after the operation. One hole was bored through the thickness of the plate and another was bored lengthwise. The piece of armor plate was on inspection in the office of the Superior Steel Company in the Lewis Block, Pittsburgh, last week, and was viewed by many persons. Immediately after this drilling was done with such satisfactory results, correspondence was entered into between the Government and the Superior Steel Company, with the result that that concern have now under way some large 1 $\frac{1}{2}$ -inch drills which will be tested further by the Government as soon as completed.

Tariff Criticism in Canada.

After the first outburst of congratulations on the reductions which had been made, the opposition press have settled down to criticise the new tariff in detail. Much of this criticism is, of course, made for political effect, and, as the usual result, much of it is illogical or unfair. Still the adjustment of the duties is not equally satisfactory to all the supporters of the government. The consequence is that the Finance Minister is besieged by delegations of this or that interest urging a postponement of the date of operation on some articles, asking a change in the rate on this finished product which has been cut proportionately more than the raw material, or suggesting a return to the old rate where the change above or below has been so slight as to have little effect on the consumer, but gives rise to considerable annoyance to importer or dealer. For, although the new tariff has gone into effect and duties are being collected under it, the debate on the budget is still on and amendments may be accepted by the government. In the case of a reduction being made in any rate, the excess duties which may have been paid on any imported article will be refunded. Even after the final vote the Governor in council has at any time the power to place an article on the free list, if it can be shown that by so doing a Canadian industry would be materially assisted and no other industry injured. Under the old tariff a dozen or more articles in the metal schedule, most of them being particular grades of steel, were transferred from time to time to the free list by orders in council. Such of these exemptions as do not conflict with the provisions of the new tariff will remain in force.

The delegations which have been to Ottawa or are preparing to go in the iron and steel or machinery interests include one from the importers asking for a postponement of the new duties on certain articles for a definite period, and one from the agricultural implement makers, who think the cut of 15 per cent. on their product too great when compared with the slight decreases in some of their raw materials. The fish plate manufacturers also complain of the cut on their goods from \$12 per net ton to 30 per cent. ad valorem, accompanied as it is by an increase in scrap iron, their raw material.

Some of the bridge manufacturers are not pleased with the change on completed structures from 1 $\frac{1}{2}$ cents per pound, "or not less than 35 per cent.," to 30 per cent. ad valorem, believing that, with the present low prices of material in other countries and the duty on the articles and shapes they use, they will be handicapped in competition with American and European bridge builders for large structures near the seaboard. No concerted action, however, has yet been taken by the bridge companies to protest against the duty, as the establishments whose facilities are only equal to the lighter class of bridge work have little to fear from foreign competition, their principal trouble being the cutting in prices made by the large home companies to keep the works of the latter running whenever they have not been busy on large structures.

The electric railway companies have a grievance, not so much in the tariff as in the definition of a word by the customs authorities. Steel rails, "for use

in railway track," weighing not less than 25 pounds per yard, were admitted free under the old tariff and are free in the new measure, unless they do not weigh less than 40 pounds. As rails now used for both steam and electric roads weigh much more than 40 pounds per yard, this change in the weight limit does not affect them. But it appears that the electric lines have, under protest, been paying the duty of \$6 per net ton imposed on rails for tramways, &c., which duty in the new tariff is changed to 30 per cent. ad valorem. At present low prices the ad valorem rate would be about equal to the former specific duty; but the electric companies claim that their roads are not tramways but railways, and therefore that they, as well as the steam railway companies, are entitled to bring in their rails free of duty. A test case, hinging on the definition of the word "railway," brought by the Toronto Electric Railway Company, comes up for decision on April 19.

Importers of wrought iron pipe are trying to obtain support for a petition to the government to take off another $\frac{1}{8}$ cent per pound on pipe not over 2 inches in diameter, so as to harmonize with the reduction made on the raw material of the Canadian maker, the duty on pipe of the above size having been lowered \$2 per net ton and on muck bar \$4 per ton.

The first benefits to the consumer in the reductions in the iron duties are found in the price of nails, the Cut Nail Association having lowered their base from \$2.25 per keg to \$1.90, the duty having been reduced from \$1 to 75 cents per keg. It will be seen that the price is fixed at a figure which just suffices to keep out American nails. The wire nail makers have not yet made known the revision of their price-list, but as the duty on wire nails is now the same as on cut nails they will have to come down somewhere near the price of the latter. The barb wire manufacturers are much dissatisfied with the cut in barb wire from 1 $\frac{1}{2}$ cents to $\frac{3}{4}$ cent per pound, and are endeavoring to have it modified, but as this reduction is one of the sop for the farmers it is not likely that the manufacturers will be successful.

Some errors have crept into our report of the new rates of duty. Boiler tubes are 30 per cent. instead of 7 $\frac{1}{2}$ per cent.; cast iron vessels, &c., 20 per cent. instead of 27 $\frac{1}{2}$ per cent.; wire nails now pay same duty as cut nails; lead pipe, shot, &c., 1 $\frac{1}{2}$ cents per pound, which are not mentioned in new tariff; comparisons with old rates on hardware and stamped tinware, which make the new duty on former appear to be an increase of 2 $\frac{1}{2}$ per cent. and on the latter no change, when in reality there is a decrease of 2 $\frac{1}{2}$ per cent. on hardware and of 10 per cent. on tinware; and old rate on bridges $\frac{1}{2}$ cent instead of 1 $\frac{1}{2}$ cents.

Blow Holes in Armor Steel.—C. M. Schwab, in his report to H. C. Frick on the charges preferred against the Carnegie Steel Company, writes as follows under date of December 12, 1893, on the question of blow holes in armor plate steel. It will be observed that Mr. Schwab is strongly in favor of acid open hearth steel for this purpose: "While not mentioned in the list of charges, you have called my attention to the blow hole question, and that we have plugged up blow holes in plates, &c. In this connection, allow me to explain fully. We will admit at once that we have had a great many plates that

showed small blow holes in the upper end of plates, and that in some instances these holes have been plugged, and in explanation will say that after many trials, both ballistic and physically, we have come to the conclusion that basic steel is by long odds better than acid steel for armor plate. Our ballistic tests have shown this in many trials. Our physical tests are also, as a rule, better on basic plates than acid plates. This we have determined for ourselves by actual trial. Now, in order to make an ingot or plate perfectly solid, when cast in large masses, it is necessary to use a great deal of silicon. Silicon is the great enemy of any basic process, being a strong acid and directly the opposite of the basic theory. Your charge of metals, for example, must be free of silicon, and your furnace linings must be free of silicon. There can be no doubt but that silicon is the only element that will make a steel casting solid. All steel makers will agree on this point. Now, to add silicon in quantity to insure solidity to basic steel is fatal to its quality. Of this there can be no doubt. Consequently we know absolutely that the best basic is that which will cast slightly porous, or have small blow holes. So firmly are we convinced of this, and so anxious were we to satisfy the Government on this point, that instead of discarding 33 per cent. from the top of the ingot, we have and now discard 66 per cent. from the top of the ingot, adding very much to our cost and expense. To avoid blow holes was also one reason why we tried acid plates, and we were so anxious to make the acid plates successful that we treated them as charged, preferring to always so treat all our acid plates, if by so doing they gave as good results as ballistic or basic and freed us from the worry of blow holes. This treatment of the acid ballistic plates was the only way we could arrive at the conclusions desired."

The Cotton Tie Situation.

Oscar M. Edgerley of 103 Front street, New York, the largest dealer in jute bagging and cotton ties in New York City, has just returned from Europe where he has studied the situation so far as the latter article is concerned. Mr. Edgerley has found that English manufacturers are unable to make steel ties of as light weight, tensile strength and finish as they are being produced in this country. They are reluctant to turn to the new material because in the district in which the principal English cotton tie mills are located iron is cheaper than steel, and the introduction of the latter material would also involve modifications of the present labor scale. In Germany and Belgium there is greater readiness to use steel, but apparently these makers have not yet learned how to produce the right quality of steel for ties, as the material stretches too much.

Individual tie manufacturers in England have proven their ability to bring down the weight of their iron ties to 46½ pounds per bundle. That seems to be the minimum attainable, since even with the high quality of the iron used the ties were pretty close to their capacity to resist the strains of service. The standard with the American steel tie is now 45 pounds per bundle, or about 50 bundles to the ton.

Mr. Edgerley finds that for iron ties, 50 pounds to the bundle, or 44 bundles to the ton, English makers quote all the

way from £6. /10 to £7. /10 per ton, delivered at shipping port, Liverpool. It is possible that in order to get the work they might get down to £6, or even £5. 17/6, the lowest price on record having been £5. /10. On the basis of £6 and with 7/6 (\$1.75) freight, insurance, &c., to New Orleans, the English cotton ties, 44 bundles to the ton, could be laid down there at 70 cents per bundle, or in iron ties light enough to weigh only 46 pounds per bundle 64 to 65 cents per bundle.

It is stated that it would take one month's preparation for the English mills, now generally idle, to get ready for rolling, and one month more to deliver the material at Southern ports. In other words, even under the most favorable circumstances for the importer, he could not deliver in time for the coming season in Texas, and any delay would make sales in other quarters almost impossible.

The consumption of cotton ties in this country is about 35 000 tons per annum for a crop of 7,500,000 bales. The Pittsburgh mills can reach the whole Mississippi territory at low rates by water, and points inland from the Atlantic and Gulf coasts by all railroads, thus restricting the foreign article to seaboard markets.

Mesaba News.

Mines on the Mesaba range are gradually starting up, and now there are not far from 1800 men at work on the range. This week the Lake Superior Consolidated resumed at Mountain Iron and Rathbun, one property, and has some 300 men there. Franklin is also at work with 150 men, and is to increase the force shortly. Oliver starts two steam shovels in the mine proper next week, while Biwabik will be shipping as soon as the docks are ready, in about two weeks. Canton of the Minnesota Iron Company has 150,000 tons in stock pile, and is working 200 men. Auburn and Norman, both also Minnesota Iron Company's mines, are being stripped, but will be worked underground by the milling process. About 300 men are busy at these properties. Work at Hale begins early this month, in preparation for an output already sold. With the possible exception of two or three properties from which sample lots will be mined, the above are all the Mesaba range shippers for 1894. That they will get out between 1,500,000 and 2,000,000 tons there is no doubt.

Some very promising explorations are now in progress on the range. In the township directly south of the rich 58-17 the McInnis and Roucheleau-Ray have both opened what appear to be large mines, the former having already over 2,000,000 tons in sight.

Mahoning Ore Company have two excellent mines fairly well proved up and are continuing operations elsewhere with eight crews of miners. The Lake Superior Iron Company have three, and will continue explorations and development all the year. P. Mitchell, late of the Comet, on the Gogebic, has just taken charge here. Lake Superior Consolidated is doing exploring on lands held under lease. Iron Chief and Lackawanna are both proving up excellent mines. Sauntry is so well shown up that they are surveying for railroad connection. Other explorations, more or less important and promising, are going forward slowly.

The Duluth & Iron Range Railway has surveyed a line down the hills into

the lake basin that reduces its maximum grades from 2.60 to 1.50 per cent., equated for curvature, also reduces its curvature greatly. It is supposed this line will be built at once after the company's annual meeting in June. Duluth, Mesabi & Northern will probably not double track its road or complete its great dock this year, as was planned. Duluth, Mississippi River & Northern is laying track to reach several large mines on the west part of the range. Duluth & Winnipeg does not expect to handle any ore this year and will make no extensions to the mines. Great Northern has decided on the course of the last link in its transcontinental line between Fosstown and Duluth and will build it this year. It will touch the Mesaba range. Arrangements are being perfected for building a third railway into the range from Duluth, and mine owners outside the two big corporations are assisting it.

A New Aluminum Solder.—One of the most perplexing questions encountered in the development of the uses of aluminum has been that of soldering the metal. In many instances the effort has been made to get around the difficulty by riveting, a method frequently awkward and often leading to structural weakness. An opportunity was offered recently to a representative of *The Iron Age* to witness a series of tests of a solder which is being introduced by the Alsite Aluminum Company, 106 and 108 Liberty street, New York. Among the tests made were butt welds of sheets and plates, which under tension showed the soldered joint to be so well made that rupture took place in every instance outside of the joint. Strips connected by butt soldering were twisted in the vise without opening the seam, and soldered tubing has been successfully drawn recently. The surfaces to be soldered are cleaned by dipping in a hot solution of soda or potash, then dipped into nitric acid, rinsed in hot water and dried. Sometimes the surfaces are cleaned by filing the edges to be joined. The parts to be soldered are heated as hot as can safely be done without melting and a small portion of the solder is spread over the edges by means of a soldering brush, which should be kept heated during the process. The edges are then joined and more solder is applied and spread evenly over with the brush. During the entire operation the metal is kept as hot as possible, and it is completed when the solder becomes distinctly white or the aluminum assumes a reddish hue. Authorities on the working of aluminum have acknowledged that soldering by the Alsite process accomplishes results not hitherto attained.

Norton Brothers, manufacturers of tin and sheet metal goods, whose Chicago factory was recently burned, have decided to concentrate their manufacturing operations at Maywood, Ill. They require much greater facilities than they now have at that place, and propose to add considerably to the plant. The new building will probably cost \$200,000 and will be located on the south side of the Northwestern Railroad and extend from Sixth to Eighth or Ninth avenue. Plans for the new structure have been completed by Frederick R. Schock, and bids for its construction are being received. The building will be constructed in the shape of a hollow square covering an area of 243 x 243 feet, two stories high. It will extend to a depth of 72 feet to

an inner court, and in the center of this a boiler house, 30 x 40 feet, will be constructed. In this court will be a one-story section on both sides of the boiler house for the use of employees. On the side of the main structure there will be an annex 21 x 155 feet. The interior of the building will be of mill construction throughout and will be provided with elevators. The exterior will be constructed of pressed brick, relieved by stone trimmings, and will be ornamented by two towers.

The Lucas Combined Engine and Boiler.

The boiler proper of the combined engine and boiler here illustrated is a horizontal tubular to which is attached the casing at the sides and the castings

Canada's Iron and Steel Markets.

A brief glance at the consumption of steel in the crude and simpler finished forms will conclude our general review of Canada's iron and steel markets. As has before been stated, there is but one establishment in Canada which produces crude steel—namely, the open hearth plant of the Nova Scotia Steel and Forge Company at New Glasgow, N. S. This plant has a capacity for producing over 20,000 tons of steel in a year. Much of this steel is rolled into merchant bars and into forms suitable for machinery, spring and agricultural implement makers. Under the old tariff the company were protected by a duty of not less than \$8 per net ton on ingots,

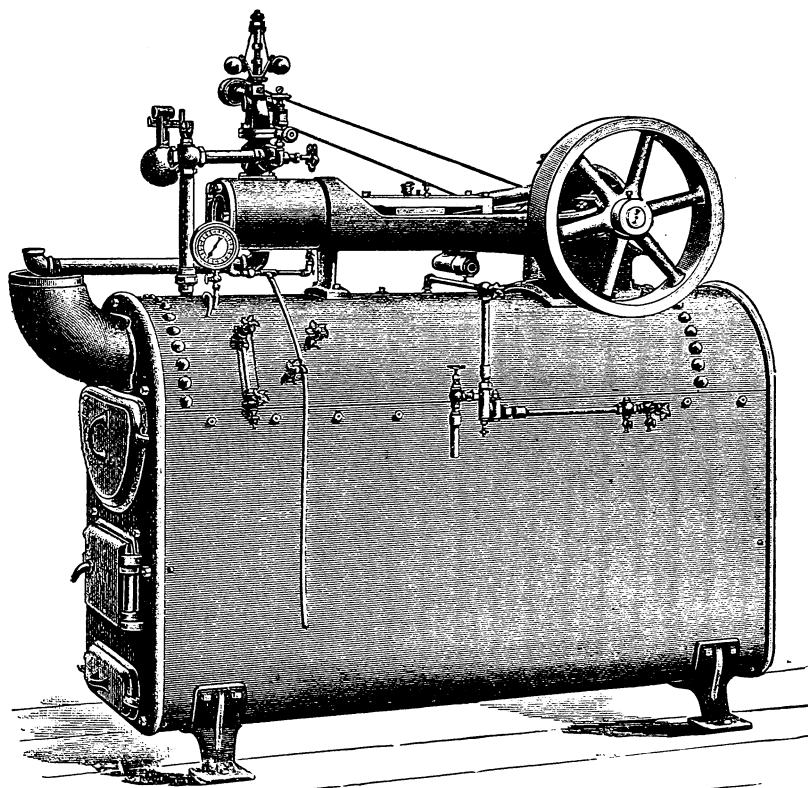
tity imported of this class is much smaller than of the cheaper grade, the tonnage for 1892 being 1517 tons, valued at \$185,566, and 1211 tons in 1893, valued at \$142,031, the United States sending 795 tons in the former year and 658 tons in the latter, Great Britain being the source of supply of most of the remainder.

The old duty on the above articles when valued at 4 cents or less per pound was 30 per cent., but not less than \$12 per net ton, a protective duty for Canadian steel. On similar articles valued at over 4 cents the duty was 12½ per cent. only. In the new tariff steel bars, bands, hoops and sheets, not thinner than 17 gauge, are dutiable at \$10 per net ton, without regard to value; when of 17 gauge or thinner the duty is 5 per cent. ad valorem. The Canadian mills evidently do not yet roll bands thinner than No. 17 gauge. Crucible steel plow plates, land sides, &c., cut to shape, but not molded or otherwise manufactured, when valued at over 4 cents per pound, were specially provided for in the old law at 12½ per cent. This duty in the new tariff has also been reduced to 5 per cent. and the word "crucible" omitted. The quantity of this steel imported is not large—190 net tons, valued at \$19,573, in 1892, and 260 tons, valued at \$36,815, in 1893. Pittsburgh firms supplied most of it, Great Britain the remainder.

Locomotive and car wheel tires of steel in the rough were imported free of duty under the old tariff, and remain free in the new. The quantity brought in in 1892 was 1380 net tons, valued at \$86,294, and 769 tons in 1893, valued at \$49,354. Germany supplied most of this tonnage—namely, 1149 tons, valued at \$72,129, in 1892, and 615 tons, valued at \$38,651, in 1893, the United States and Great Britain the remainder. There were a large number of other steel products exempted from duty by the old tariff, or by order in council, when imported for special purposes, such as steel of certain gauges and values for files, saws, straw cutters, skates, corset steels, clock springs, buckles, clasps, ice creepers, shovels, spades, &c. These exemptions are maintained in the new law when they do not conflict with any other provisions of the tariff. The total quantity of steel imported under these exemptions in 1892 was 1071 net tons, valued at \$120,881, and 1625 tons in 1893, valued at \$152,768. Of these quantities the United States supplied about one half—namely, 524 tons, valued at \$64,539, in 1892, and 735 tons, valued at \$31,879, in 1893, Great Britain supplying most of the remainder.

It would not be profitable to enter into a discussion of the prices on the above mentioned classes of steel, as the grades, sizes, qualities and real or fancied characteristics are too numerous to be treated of in a reasonable space and the market for any one variety too limited to be important. The trend of trade in the aggregate is shown by the figures of imports.

In illustrating the work now accomplished by power and power machinery in our mechanical industries and upon our railroads, Carroll D. Wright recently stated that this work would require, if done by human muscle, a population of 172,500,000, in addition to the present population of the country of 65,000,000, or a total population, with hand processes and with horse-power, of 227,500,000, which population would be obliged to subsist on present



THE LUCAS COMBINED ENGINE AND BOILER.

inclosing the ends. The grates are supported at the front by the boiler front and at the back they rest on one end of a large soot plate. The casing is lined throughout by heavy fire brick, which are supported at the side by the soot plate and which rest alongside of the grates. Both the front and back end castings are lined. The boiler has an internal dome so arranged along the inside and upper part of the shell as to gather the steam along the surface of the water as it is formed. This form of boiler allows the flues to be covered their entire length. The shell and hoods are made of flanged steel. The crank shaft and pin of the engine, which in the small sizes is usually mounted on the boiler, are about half the diameter of the cylinder, and the shaft bearings are long and lined with babbit. The engines are made upon the interchangeable system. These engines and boilers are built in four sizes of 3, 5, 7 and 9 horse-power by C. O. Lucas & Co. of Greenville, Ohio. When desired the engines are furnished separately, mounted on a bed plate.

blooms and slabs valued at 4 cents per pound or less. Under the new tariff the duty is changed to \$5 per net ton, including billets, but a bounty of \$2 per ton on the crude steel produced in Canada is also to be granted, thus putting the steel maker on the same ground as the muck bar manufacturer.

The imports of ingots, blooms and slabs have not been large, the quantity brought in under that head (probably all slabs) in the fiscal year 1892 having been 178 net tons, valued at \$3843, and 1085 tons in 1893, valued at \$19,353, nearly all coming from Great Britain. Of billets, bars, bands and sheets, not elsewhere specified, valued at 4 cents per pound or less, there were imported 6315 net tons in 1892, valued at \$232,121, and 7086 tons in 1893, valued at \$246,114. Of these quantities the United States sent 972 tons in 1892 and 1547 tons in 1893, nearly all the remainder coming from Great Britain. Of similar steel articles valued at over 4 cents per pound the United States sends a larger proportion than any other country, although the total quan-

means. In an economic view the cost to the country would be enormous. The present cost of operating the railroads of the country with steam power is, in round numbers, \$502,600,000 per annum; but to carry on the same amount of work with men and horses would cost the country \$11,308,500,000.

The Foundrymen's Association.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club, in Philadelphia, on Wednesday, 4th inst., with a large attendance of members. The president, Francis Schumann of the Tacony Iron & Metal Company, Philadelphia, occupied the chair. The secretary stated that the minutes of the last meeting had appeared at length in *The Iron Age* of the 15th ult., and, this being the case, he thought it would be useless to take up the time of the meeting in reading them. Upon motion, the minutes of the meeting, as published in *The Iron Age*, were approved. The Executive Committee reported that at a meeting of that body, held on the 20th ult., the affairs of the association were discussed and found to be in a most satisfactory condition. The well attended meetings of the association showed an appreciative feeling on the part of members. "Chemical analysis vs. the ordinary practice in foundries" had been pretty well discussed. The committee believed that much good would result from the discussion and that a foundryman employing both methods would have an advantage. Much credit was due to Mr. Keep for opening up the matter, and to the chemists for so carefully discussing the subject.

Reports from special committees being next in order, the Price Committee reported by sections.

Car Wheel Section.—Asa Whitney of A. Whitney & Sons, Philadelphia, for this section reported that business remained about the same. He was pleased to say that he had heard of no lower prices than those quoted at the last meeting, and there was a noticeable increase in the number of inquiries, which showed a better disposition on the part of buyers to do business.

Sash Weight Section.—E. E. Brown of E. E. Brown & Co., Philadelphia, for this section, reported that few inquiries were coming in, and prices were very low indeed. In several localities goods were being sold below cost. There seemed to be very little work offering.

Soil Pipe.—R. A. Regester of Regester & Sons, Baltimore, reported that prices were a shade lower than last reported.

Small Malleable and Gray Iron Castings.—Stanley G. Flagg, Jr., of Stanley G. Flagg & Co., Philadelphia, for this section reported that prices were unchanged. There seemed to be more inquiry and a little more business offering.

Cast Pipe.—P. D. Wanner of the Reading Iron & Foundry Company, representing this section of the committee, said that prices were very low. They had continued to get lower month by month and were lower than ever so far in April. He did not know where it would stop unless the founders stopped. He did not know but what manufacturer were themselves in a great measure responsible for the present hard

times. It would be noticed by the proceedings in Congress that Congress had been in session over four months, and that a great deal of animosity and feeling had been shown in the speeches of men active in this tariff reform movement against the manufacturers of the country, and they had said a great many things which were not true. He said that if manufacturers would do their duty and stick together as they should, they would unite in declaring that the trouble had been kept up long enough and that they would fix a time for stopping their works. That, he said, would bring on a crisis inside of ten days. It would either cause a passage of the bill or it would defeat it. Either course, he said, would give the country relief. He thought a movement of this kind would have force and prove very effective. Most manufacturers were losing money, he said, in trying to keep their factories running and the workpeople employed. Such a movement started, say by this association, he believed would take generally. Manufacturers could allow until May 1 for a settlement of the bill and then say, "Now, we have waited for you for five months. We have been going through the valley of the shadow of death and we will wait no longer. We will shut down our works and hold you responsible for the consequences." It was not the silver question which had brought on the depression and the condition of the country did not improve after the silver bill was defeated. Another bill had been defeated, but the country's condition had not improved a particle. It was the interference with the tariff which was causing the trouble. If manufacturers would stick together he believed they could stop the uncertainty quickly.

The treasurer, Josiah Thompson, reported a balance of \$282.38 in hand, and all bills paid.

Under the head of new business, Secretary Evans then called the attention of the members present to Mr. Keep's paper before them that evening. This paper, he said, answered the criticisms which had appeared in print and otherwise, and was the last paper that Mr. Keep proposed to present for some time to come. The paper was very lengthy, and would take probably the greater portion of the time at the disposal of the meeting for its reading. The paper contained several tables too, which would fall rather flat if simply read in the ordinary way. It would, therefore, be better, he thought, if members would take copies home with them and read them, so that the matter could be intelligently discussed at the next meeting. This plan being approved by the meeting, the subject was deferred to the next meeting, when it will be fully discussed. The following is the paper:

Foundry Mixtures Controlled by a Mechanical Analysis.

It seems that a chemist cannot give a formula for the chemical composition of a casting that shall have a specified strength, shrinkage and chill, unless he can first analyze a casting that has such physical qualities.—*Mr. Fry, at last meeting.*

The expression, "a physical test," seems to be universally understood to mean a test for strength, using a test bar having 1 or more inches cross section.

The foundry mixture is governed by the record of shrinkage of the test bars, which tells whether there is enough or too much silicon in the casting. If the

shrinkage is not as low as has been found best for such castings, increase the irons that are high in silicon, and if the shrinkage is too low, increase the low grade irons or scrap. This mechanical analysis takes into account the influence of all elements in the iron, for if carbon is low, it requires more silicon to produce a given effect, and *vice versa*. If any condition increases shrinkage, more silicon is needed to bring it down. What the founder wants to know, and to know it quick and sure, is whether he has the right amount of silicon in his castings. The shrinkage tells him at once. It also indicates hardness, for the two rise and fall together. By splitting the end of the square bar, the depth of chill is measured, which is an additional guide. The grain of the fracture of the test bar tells an intelligent foundryman whether a casting of a certain size will be spongy or too close. Four other $\frac{1}{4}$ -inch square bars are cast at the same time. These five square bars are broken in a special testing machine, which makes an autographic record of strength, deflection, set and elasticity, and the average of these five is the record.

Relative tests are those which are applicable to every case. The routine must be the same in all tests, and any test record of any iron or casting is greater or less than other tests by the same method. It is soon found what test record accompanies acceptable castings for any purpose, and this record at once becomes the standard record for such castings in that foundry, though it may not correspond to results obtained by others. Having determined what is the most satisfactory shrinkage for each grade of casting, the endeavor thereafter is to keep as close as possible to the standard.

The record of the sensitive $\frac{1}{4}$ -inch test bar is the unit of measure for any mixture, the same as a foot rule is a measure for the smallest or greatest variation in size. Strength generally cannot be traced directly to chemical constitution, or to shrinkage, but is dependent on the mechanical structure of the metal, and the test of strength is to find if we have made a mixture that brings out the greatest strength.

Keep's Foundry Chemistry.—My reason for giving this name to my conclusions regarding the chemical elements found in cast iron, was to draw attention to the radical difference between them and the opinions of the average chemist, as stated in works on iron metallurgy. For 20 years I was a close student of metallurgical chemistry, in charge of foundry work, and failed to find a relation between the chemical composition and the strength of test bars of various shapes. Mr. Mumford had a similar experience.

When I hit on a $\frac{1}{4}$ -inch test bar as a test for shrinkage, I found a solution of the whole question and found that silicon, the controlling agent of the mixture, was indicated by shrinkage.

But no physical characteristic corresponded to either of the carbons, or to phosphorus, sulphur, or manganese. In 1885 Professor Turner hit on the use of a series of test bars, with silicon the only variable. I at once applied the same method to all of the chemical elements, and found the exact influence of each when in cast iron. I found, also, that in the quantities usually found in pig iron, or in gray foundry castings, the influence of all but silicon was almost imperceptible, and that all but silicon, in ordinary practice, could be overlooked. In this light, each iron analysis is in perfect accord with physical tests of all kinds, and mystery and

superstition are banished from iron mixture.

Proof of My Position.—As chemists either dislike, or are not familiar with my mechanical analysis, I will go back to laboratory methods for my proof. Within a few weeks the Tennessee Coal, Iron & Railroad Company have sent me a pig of each of the 11 grades of iron made at their furnaces, the same mixture of ores being in each pig. Each pig contained the hole from which their chemist, Dr. Phillips, took his drillings. I made a set of test bars from each, and the chemical and physical records are Series I.

A. J. Morse, now instructor in metallurgy in the School of Mines, Rapid City, S. D., sent me, about the same time, 14 pigs, with the drilled holes in them. As he had completed the graphitic carbons in only six, I make of these Series II.

Several years ago a foundry on the Hudson River procured a complete analysis of the irons entering into their mixture, and of the castings, and sent the pigs and castings, with analyses, to me. These are Series III.

I have arranged all of the above irons in the order of their silicones.

Series IV is composed of tests of a single mixture of cupola iron, melted with coke, taken a week apart. Tests 788 and 791 were the very first and last iron taken from the cupola, to determine the influence of a cold and a hot cupola. Tests 780 and 782 were cast $1\frac{1}{2}$ minutes apart, from one ladle, the iron being stirred with a steel bar between casts. Tests 784 and 787 were cast $2\frac{1}{2}$ minutes apart, the iron being allowed to stand quietly between casts. The full test records can be seen in Series VII. The test bar 782 is the strong bar for which I challenged a prescription, and now that I have given the analysis, Mr. Fry can possibly tell what his prescription should be, but the same result can be obtained with almost any other composition, when the percentages of silicon, phosphorus, sulphur and manganese are less. Series IV is produced to show all who have held a different opinion that the physical qualities of a casting cannot be produced by a chemical formula alone, but that a test of the right kind will tell when the mixture is such as to produce the most desirable physical structure.

Series II.

No. test.	Name of iron.	Total carbon.	Graphitic carbon.	Combined carbon.	Silicon	Phosphorus.	Sulphur.	Manganese.
715	Ensley, G. F.	3.14	2.21	0.93	2.62	0.88	.....	0.16
717	Summerlee No. 1.	3.38	2.92	0.46	2.00	1.27	.....	1.67
719	Tuscarawas 2 F.	3.62	3.18	0.44	1.93	0.70	.....	0.86
719	Sloss, G. F.	3.37	2.85	0.52	1.77	0.56	.....	0.40
720	Napier No. 3.	3.65	3.50	0.15	1.76	0.85	.....	0.48
710	Eureka 3 F.	3.45	2.90	0.55	1.54	0.83	.....	0.23

No. test.	Name of iron.	Dead load.		Impact.		Shrinkage.		Chill.
		Strength	Def.	Strength.	Def.	Square.	Flat.	
715	Ensley, G. F.	368	0.20	339	0.22	0.185	0.186	0.25
717	Summerlee No. 1.	377	0.17	288	0.18	0.195	0.185	0.65
719	Tuscarawas 2 F.	418	0.24	390	0.26	0.154	0.177	0.30
719	Sloss, G. F.	442	0.22	407	0.26	0.164	0.197	.....
720	Napier No. 3.	433	0.19	331	0.21	0.165	0.199	0.80
710	Eureka 3 F.	443	0.25	416	0.27	0.159	0.163	0.45

Series III.

No. test.	Name of iron.	Total carbon.	Graphitic carbon.	Combined carbon.	Silicon	Phosphorus.	Sulphur.	Manganese.
178	No. 1 Globe, Silvery.	3.154	2.852	0.302	5.899	1.100	0.020	1.000
181	Alice, Silvery, Ala.	2.963	2.742	0.221	4.553	0.597	0.010	0.199
179	No. 2 Franklin, N. Y.	3.179	3.064	0.115	3.014	1.433	0.007	0.168
176	No. 1 Poughkeepsie..	3.266	3.166	0.100	2.946	1.242	tr.	0.189
175	No. 1 Bushong.	3.343	2.879	0.464	1.932	1.089	0.013	0.136
177	No. 2 Poughkeepsie..	3.572	3.457	0.115	1.642	1.224	0.035	0.241

304	Casting.....	3.157	2.845	0.311	2.910	1.027	0.054	0.252
	Estimated in casting.	3.214	2.927	0.287	3.031	1.070	0.025	0.248
Loss.....		0.047	0.081	.....	0.127	0.043	.....	.....
Gain.....		.....	.....	0.024	.....	.....	0.029	0.004

No. test.	Name of iron.	Dead load.		Impact.		Shrinkage.		Chill.
		Strength	Def.	Strength.	Def.	Square.	Flat.	
178	No. 1 Globe, Silvery.	297	0.16	204	.....	0.187	0.170	0.02
181	Alice, Silvery.	325	0.32	311	.....	0.120	0.160	0.06
179	No. 2 Franklin	328	0.21	282	.....	0.137	0.152	0.10
176	No. 1 Poughkeepsie..	355	0.25	333	.....	0.134	0.147	0.12
175	No. 1 Bushong.	374	0.23	327	.....	0.152	0.157	0.18
177	No. 2 Poughkeepsie..	376	0.22	282	.....	0.148	0.152	0.20
304	Casting.	363	0.23	339	.....	0.124	0.149	0.10

Fuel, Cross Creek anthracite coal, carbon, 88.94; ash, 10.18; P., 0.075; S., 0.159

Series I.—Chemical Analysis.

No. test.	Southern pig iron.	Total carbon.	Graphitic carbon.	Combined carbon.	Silicon	Phosphorus.	Sulphur.	Manganese.
731	No. 2 Silvery.....	1.51	0.58	0.93	4.91	0.58	0.08	0.25
730	No. 1 Silvery.....	2.17	1.60	0.57	4.70	0.59	0.06	0.27
728	No. 1 Soft.....	2.94	2.11	0.83	3.65	0.60	0.06	0.27
729	No. 2 Soft.....	2.81	2.00	0.81	3.24	0.76	0.05	0.21
721	No. 1 Foundry.....	2.88	2.42	0.46	2.53	0.60	0.04	0.23
724	Foundry Forge.....	2.29	2.28	0.01	2.16	0.62	0.19	0.19
722	No. 2 Foundry.....	2.16	1.90	0.26	2.00	0.79	0.08	0.23
723	No. 3 Foundry.....	2.14	2.04	0.10	1.83	0.77	0.10	0.31
725	Gray Forge.....	1.79	1.51	0.28	1.74	0.70	0.17	0.38
726	Mottled.....	2.74	1.00	1.74	1.35	0.76	0.36	0.31
727	White.....	2.01	0.67	1.34	0.94	0.76	0.42	0.29

Physical Analysis.

No. test.	Southern pig iron.	Dead load.		Impact.		Shrinkage.		Chill.
		Strength	Def.	Strength.	Def.	Square.	Flat.	
731	No. 2 Silvery.....	295	0.24	365	0.27	0.140	0.136	0.01
730	No. 1 Silvery.....	360	0.27	407	0.32	0.131	0.138	0.02
728	No. 1 Soft.....	375	0.27	407	0.32	0.149	0.157	0.04
729	No. 2 Soft.....	393	0.25	322	0.32	0.130	0.154	0.02
721	No. 1 Foundry.....	384	0.25	407	0.30	0.156	0.145	0.01
724	Foundry Forge.....	362	0.20	305	0.21	0.164	0.164	0.15
722	No. 2 Foundry.....	365	0.27	373	0.30	0.159	0.161	0.01
723	No. 3 Foundry.....	354	0.19	254	0.20	0.161	0.148	0.30
725	Gray Forge.....	355	0.23	356	0.27	0.160	0.163	0.0
726	Mottled.....	372	0.11	186	0.14	0.228	0.213	White
727	White.....	435	0.13	237	0.15	0.240	.....	White

The cupola charge was 1800 pounds coal on bed; the charge of iron was 4000 pounds, and of coal 300 pounds, &c.; the melt was 16 tons, and they did not slag the cupola. (Each iron charge was 1000 pounds Bushong, 250 pounds each 1 and 2 Poughkeepsie, 500 pounds each Alice and Franklin, 250 pounds Globe and 1250 pounds of remelt.)

To be certain that the determinations of Series IV were absolutely correct, we sent the iron to Cary & Moore of Chicago asking them to make the analyses in triplicate. The analyses are of the same bars of which the physical record is given. The averages are given in Series VII to IX.

In examining these series, the records of the whole must be considered to draw conclusions.

Manganese.—These series do not indicate any influence from the presence of this metalloid, and I have proved in my paper, "Manganese in Cast Iron" (Transactions Am. Inst. Mining Engineers, vol. xx, p. 291, 1891), that it need not be feared when it is below 1 per cent. in the casting, and that it can be ignored. When above 1 per cent. it increases shrinkage and hardness, but it does not increase combined car-

bon. It does not turn iron white or increase a tendency to chill.

Phosphorus, in these series, gives no indication of any influence on the physical qualities of the iron. I have proved in my paper, "Phosphorus in Cast Iron" (Trans. A. I. M. E., vol. xviii,

heat producing power, and this caused the cupola to melt cold.

In Series I, it was probably some chilling influence in the furnace that gave the close grain to the foundry forge and not low silicon, and this allowed sulphur to remain, and it also

compared with the pig irons and the fuel, but it has so low a shrinkage and chill as to prevent any claim that the sulphur has exerted any evil influence. The proof seems complete that it may safely be ignored.

Carbon is the most important element in cast iron. Without it iron could not be melted and made into castings. The percentage of total carbon determines the melting point of the iron. Carbon in melted iron is always combined, and more can be retained by the iron when fluid than when cold. On cooling, any surplus separates out into graphite and makes a gray casting. Total carbon, no doubt, exerts an influence on strength, but such is not marked in these series.

Combined Carbon, in these series, is not by any means a controlling element, as hardly any relation can be traced between it and the physical composition. Silicon will decrease it, but in any pig iron it is difficult to account for its presence, except on account of a lack of heat in the furnace.

Graphitic Carbon, in the series, does not correspond to any physical quality to an extent to attract attention. By its dividing the grains of metal, it softens carbonized iron; it also removes brittleness, and by the mechanical separation of the grain may cause weakness, but so many variations occur that the only way to be certain as to strength is by actual test. This form of carbon gives trouble in large castings and those which must resist hydraulic pressure by causing a spongy and open grain. It is sometimes difficult to obtain the requisite strength, closeness, lack of brittleness, softness, and low shrinkage. We do not get this knowledge from chemistry, but from practical experience. The eye, guided by common sense, will soon tell what grain is necessary to make castings fit for every purpose.

Silicon lessens the ability of iron to hold carbon in the combined state when cold; therefore, any increase of silicon will increase the graphitic carbon.

Silicon is of little use in cast iron, except as it acts on carbon. Its influence is not direct, but through its change in the carbon. The greater the quantity of carbon present, the greater will be the influence of silicon. Silicon is the controlling element, and is the only element that the founder need take account of, except to see that the iron contains sufficient carbon for the silicon to act upon. By silicon changing combined carbon into bulky graphite, the casting occupies more room than if the carbon remained combined. This is what lessens shrinkage. The more silicon, the more graphite, and the less shrinkage.

There can be no doubt about this, after the irons of these series are examined. As silicon grows less shrinkage increases. In very high silicon iron, so much of the carbon is completely driven out that there is not sufficient left for the silicon to act upon to reduce shrinkage, and silicon of itself increases shrinkage.

The regulation of a foundry mixture by variation of silicon shows the influence of silicon on carbon in varying shrinkage; for all other elements remain unchanged. In this case a variation of silicon varies chill and strength to some extent ("Silicon in Cast Iron," A. I. M. E., vol. xvii, p. 863, 1889). Different kinds of castings require different percentages of silicon, which can be learned by the founder by a study of the shrinkage of a $\frac{1}{2}$ inch test bar. The figures representing the percentage are of little account. What he wants to

Series IV.

No. test.	Treatment.	All tests from same mixture.	Total carbon	Graphitic carbon.	Combined carbon.	Silicon.	Phosphorus.	Sulphur.	Manganese.
788	Temperature test.	First of heat.....	2.910	2.280	0.630	3.220	1.025	0.123	0.490
791		Last of heat.....	2.950	2.470	0.480	3.140	1.055	0.100	0.470
780	Iron stirred.	First set } One	.....	.....	.....	3.520	.....	0.081	.....
782		Third set } ladle..	.....	.....	.....	3.520	.....	0.080	.....
784	Allowed to stand.	First set } One	.....	.....	.....	3.460	.....	0.079	.....
787		Fourth set } ladle	.....	.....	.....	3.450	.....	0.083	.....

No. test.	Treatment.	All tests from same mixture.	Dead load.		Shrinkage.		Chill.
			Strength.	Def.	Square.	Flat.	
788	Temperature test.	First of heat.....	390	0.22	0.163	0.132	0.15
791		Last of heat.....	400	0.22	0.121	0.140	0.07
780	Iron stirred.	First set } One	440	0.23	0.123	0.139	0.05
782		Third set } ladle..	530	0.27	0.131	.....	0.02
784	Allowed to stand.	First set } One	400	0.23	0.128	0.143	0.02
787		Fourth set } ladle	500	0.25	0.128	0.136	0.02

p. 450, 1889), that this metalloid in cast iron has no effect on carbon; that it decreases shrinkage and adds some life to molten iron. It weakens cast iron when much over 1 per cent. American pig iron will rarely impart to castings more than this percentage, and for this reason it may be ignored.

Sulphur.—We now come to the element which many claim to be poison. We have high sulphur in five of the irons in Series I, but in these irons it has absolutely no influence on dead load strength. Perhaps it has a slight influence on impact strength. We might infer that it increased chill, but the gray forge, which is one of the highest in sulphur, and which is low in carbon, has absolutely no chill.

In Series IV the iron mixture is the same in all. The chemical composition is the same in all (except 788), except that sulphur and silicon vary slightly. If any one claims that the small variation in sulphur has produced any physical change, they are met by tests 784 and 787, where the highest sulphur is in the latter, but with absolutely no physical variation, except for the better. The more sensitive flat test bar shows decreased shrinkage, and the strength is increased 25 per cent. In all of the irons of Series I and IV, the increase in sulphur and the change in physical character was due to a cold furnace or cupola. Test 788 was taken from the cupola when it first began to melt, and was comparatively cold. There was no slag to cover the iron, and the cold blast reached all parts, and gave the iron considerable chill, and allowed quite a percentage of carbon to remain combined, and gave the iron a high shrinkage. It was not the sulphur that did this, because 787, the last iron taken from the cupola, has also substantially the same sulphur, with the lowest shrinkage and less than half the chill. All that produced this change was the heat, for silicon is less in 787. On that day a sulphury car of coke was used. Sulphur is accompanied by slate, which means increased ash, that is deficient in

gave iron a chill. The same was true of the No. 3 foundry. The gray forge got its close grain from a lack of carbon and low silicon. We have in this almost 0.2 per cent. sulphur and absolutely no chill.

In my paper, "Sulphur in Cast Iron" (Engineering Congress, Chicago, 1893), I show that in tests where sulphur is higher than one-half of 1 per cent. chill is increased, but there is no indication anywhere that sulphur is in any way beneficial. To melt iron hot, the fuel should be reasonably free from sulphur. Pig iron with a good grain will be low in sulphur.

The amount of sulphur in gray iron castings made from merchantable pig iron will be so low in sulphur that it will exert no perceptible influence, and can be ignored. Chemists are very apt to blame sulphur for anything that is mysterious. One, at your last meeting, related that he told a New York founder that 1 per cent. of sulphur in his fuel had added 0.15 per cent. of sulphur to his casting, and that this had turned the iron white. The poor fuel melted cold, but he acknowledges that he did not know the carbon in the pig, and he does not seem to know that, if he had prescribed an increase of silicon, the castings would have been gray and soft. No analysis was necessary, for the white fracture indicated that silicon was needed. If sulphur should exert any influence, a slight increase of silicon would at once remove the influence.

I am told that for malleable iron castings, for chilled castings, especially where they are subjected to heat, very small percentages of sulphur will work damage. I do not know that from personal knowledge, and am pleased to make this statement, because in England it is feared that my position regarding sulphur in gray castings may encourage the use of sulphurous ores and fuel. (President Roberts' annual address, South Staffordshire Institute of Iron and Steel Works Managers, 1894). It will be noticed in Series III that the casting is high in sulphur, as

know is whether the casting contains the right amount.
Silicon is more effectual as found in some irons than in others. To illustrate this we introduce Series V.

F.L.M. is a Swedish charcoal pig which I used in trying other irons. It is very sensitive to any outside influence. Ashland is a very close grained silvery iron. The No. 3 silvery (794) contained nearly

the same silicon, and had a similar close grain. For 793 and 792 enough of each of these silvery irons was added to F.L.M. to make the silicon of the mixture 2.50 per cent. If only an analysis of silicon and combined carbon had been made, it would be conceded that 794 was better than 525. It has high sulphur, but this does not seem to increase combined carbon. The phosphorus was about 0.80 per cent., while that of 525 was high. As a reducer of shrinkage 525 is perfect, but 794 increases shrinkage. As a reducer of chill 794 is better than 525. The inability of 794 to reduce shrinkage lay in its own lack of graphite. Total carbon in 792 is reduced so much that its shrinkage is greatly increased. This proves positively that a silicon analysis, or silicon and combined carbon analysis, is not as safe a guide in the purchase of an iron as the shrinkage test—that is, a mechanical analysis.

Fracture and Silicon.—The irons of Series I were selected by the face of the pig more than by fracture, and this is the furnace method of grading. These pigs were drilled and shipped to me at once before any determinations were made, but the analyses show that the surface grading was correct, and the fracture is such as to leave no question as to grade, and it also shows that the silicon is indicated by the fracture, except in the single case of foundry forge. It is a little remarkable that about the only thing that the chemical analysis of these pigs does show is that the appearance of the pig indicates quality so far as silicon and carbon are concerned. It is a fact beyond a question that of two irons having the same chemical composition the one having the most open grain will make the best castings, because it was made at a higher temperature.

The Purchase of Pig Iron by Analysis would lead to more dissatisfaction than by fracture, because the openness of the grain is very important. It would amount to a guarantee on the part of the furnace, and 50 cents per ton would be a small advance to cover expense and risk. If a second analysis was made it would not agree with the first. It is never claimed that anything but silicon would be guaranteed, but total carbon is of as much importance as silicon. If the founder knows enough about iron to know the approximate silicon by the fracture, he will be able to buy silicon cheaper by fracture, and if the iron happens to be deficient in silicon it is easily made up. For example, Alice of Series III was bought and delivered as No. 2 foundry, but proved to be the best silvery iron that could be bought. Even if silicon is the same in an open and in close grained iron, the close grained iron is most likely to be deficient in carbon, or to have been made at a low heat.

Physical Quality Independent of Chemical Constitution.—This is true to a great extent, as the following will prove. In Series VI from the same ladle of iron were poured two sets of test bars, one set (653) cast horizontal and the other (655) cast on end, being fed from the bottom. The test was repeated in 672 and 673.

No one would claim any difference in chemical constitution. In Series VII I give four average tests to show the influence of time and cooling after iron is caught in a ladle. Time allows particles of slag and gas to escape, and cooling causes a more compact grain.

The two sets of tests in Series VIII are exactly alike, but made some days apart. The ladle held 28 pounds of iron,

Series V.

No. test.	Name of iron.	Total carbon.	Graphite.	Combined carbon.	Silicon.	Phosphorus.	Sulphur.	Manganese.
441	F.L.M.	3.550	3.220	0.33	1.249	0.080	0.040	0.190
525	No. 3 Ashland Silvery	3.333	3.124	0.209	4.700	1.543	0.044	0.913
794	No. 3 — Silvery	1.210	1.160	0.05	4.410	.....	0.114	.....
793	441 and 525	Carbon not materially lowered.			2.50	Inc.	Same	.....
792	441 and 794	Carbon is materially lowered.			2.50	Same.	Inc.	.....

No. test.	Name of iron.	Dead load.		Impact.		Shrinkage.		Chill.
		Strength	Def.	Strength.	Def.	Square.	Flat.	
441	F.L.M.	382	0.27	339	0.26	0.168	0.186	0.40
525	No. 3 Ashland Silvery	332	0.15	145	0.14	0.156	0.155	0.50
794	No. 3 — Silvery	280	0.17	.....	.....	0.184	0.183	0.01
791	441 and 525	378	0.22	246	0.19	0.143	0.156	0.23
792	441 and 794	407	0.25	399	0.27	0.190	0.185	0.15

Series VI.

No. test.		Dead load strength.	Gain.	No. test.		Dead load strength.	Gain.	Impact strength.	Gain.
653	Horizontal.	373	.....	672	Horizontal.	383	.....	435	.....
655	On end.	512	139	673	On end.	438	55	526	91

Series VII.

No. test.	28 pounds iron in one ladle. (Rested.)	Dead load.		Impact.		Shrinkage.		Chill.
		Strength.	Def.	Strength.	Def.	Square.	Flat.	
784	Poured on reaching floor.	388	0.23	348	0.24	0.128	0.143	0.02
785	Poured one minute later.	393	0.21	331	0.23	0.128	0.139	0.02
786	Poured one minute later.	424	0.21	408	0.25	0.128	0.135	0.02
787	Poured one-half minute later.	466	0.24	347	0.24	0.128	0.135	0.02

Series VIII.

No. test.	28 pounds of iron. (Stirred.)	Dead load.		Impact.		Shrinkage.		Chill.
		Strength.	Def.	Strength.	Def.	Square.	Flat.	
776	Poured on reaching floor.	408	0.21	296	0.22	0.127	0.140	0.02
777	Poured ¼ minute later.	463	0.26	313	.....	0.126	0.137	0.02
778	Poured ½ minute later.	481	0.26	423	0.24	0.127	0.135	0.02
779	Poured ¾ minute later.	483	0.26	304	0.20	0.127	.....	0.01
790	Poured on reaching floor.	418	0.22	399	0.24	0.123	0.139	0.05
781	Poured ¼ minute later.	488	0.27	458	0.25	0.123	0.139	0.04
782	Poured ½ minute later.	508	0.27	491	0.26	0.131	.....	0.02
783	Poured ¾ minute later. ....	.....	.....	.....	.....	0.128	.....	0.02

Series IX.

No. test.	Difference in cupola temperature.	Dead load.		Impact.		Shrinkage.		Chill.
		Strength.	Def.	Strength.	Def.	Square.	Flat.	
788	First iron from cupola.	373	0.21	263	0.20	0.162	0.182	0.15
789	One hour later.	369	0.21	280	0.21	0.137	0.147	0.04
790	One hour later.	367	0.21	297	0.22	0.130	0.141	0.05
791	Last iron.	393	0.22	398	0.25	0.121	0.140	0.07
795	First iron.	431	0.22	373	0.24	0.158	0.165	0.06
796	One hour later.	430	0.23	432	0.27	0.132	0.144	0.03
797	One hour later.	448	0.23	424	0.26	0.136	0.140	0.03
798	Last iron.	396	0.23	297	0.22	0.132	0.144	0.06
799	First iron.	415	0.23	373	0.24	0.159	0.165	0.07
800	One hour later.	453	0.23	382	0.24	0.136	0.148	0.03
801	One hour later.	455	0.25	398	0.26	0.130	0.141	0.05
802	Last iron.	447	0.27	415	0.25	0.125	0.140	0.06

and on reaching the molder's floor a steel bar with the end about 1 inch in diameter was introduced 2 inches below the surface, and with it the surface was stirred slowly for one-half minute. I took one-quarter minute to pour the three flasks of test bars. The surface was then stirred as before, and so on. The metal was so cold that before the fourth pouring the surface was stirred very little. The metal was cooled more than in Series VII, and the agitation, no doubt, helped to remove slag and gas.

In Series IV I gave analysis by Cary and Moore of one bar of the following tests: (784) Si 3.46, S 0.079; (787) Si 3.45, S 0.083; of test (780) Si 3.52, S 0.081; (782) Si 3.52, S 0.080. The analysis of the series 776-779 would have been substantially the same because the iron mixture was not changed. There is practically no variation in shrinkage and chill and no variation in chemical composition, and yet there is a very great change in strength, which is due to two causes, the clearing of the metal from slag and gas on account of time, and the lessening of internal stress, because the first bars poured, formed a rigid shell around very hot metal. In cooling and crystallizing, each grain tended to pull away from those next to it. The bars of the last cast being colder, made a more solid casting with less internal stress. It is always customary to allow metal to become as cold as possible before pouring, so as to get the greatest strength.

Getting metal which has been melted hot in a cupola, into a mold as cold as possible, must not be confounded with melting cold in a cupola. Of this latter I give three examples in Series IX. The cold cupola, at the beginning of a heat, gives high shrinkage every time, and the shrinkage comes down as soon as the cupola is hot. A complete analysis of tests 788 and 791 was given in Series IV. The iron in this first experiment was poured as soon as the molder reached his floor. The cupola mixture of the last two was the same as in the first, but the molder used the first part of his iron for other work and poured the test bars with the last iron in his ladle. The iron went into the molds of the first hot, and into the last two cold, and after some agitation in pouring the other work. In this way this series show the effect on strength of manipulation, not in the least dependent on chemical constitution. These series show the exceeding sensitiveness of "Keep's Test," and what information it can give the founder.

Suggestions for Using "Keep's Test" in the Purchase of Pig Iron and in Controlling a Foundry Mixture.—Remember that we ignore phosphorus, sulphur and manganese in our casting, but in purchasing iron always give preference to iron having the least (and always buy the purest coke possible, because it gives most heat). Carbon must be taken as we find it. The more there is, the less silicon will be required to produce a desired result, and *vice versa*. Silicon can do nothing except through carbon, and carbon may be so low that silicon cannot reduce shrinkage. You must know from such tables as Series I, II and III the average silicon in the grades of iron which you use. Use as many varieties as you can, counting each number and name a variety. This is to lessen the chances for change in quality of casting, on account of change in some iron. To make your first mixture, if your casting ought to contain 2.25 per cent. of silicon (err by having it too high rather than too low), make a mixture for the cupola charge which

will give approximately $2\frac{1}{2}$ per cent. Run off a heat, and make one flask containing a square and a flat test bar, cast in yokes to get shrinkage and chill, and two flasks containing only square bars. Arrange to catch the iron at one time each day, and treat it always in exactly the same way. Perhaps the best way for ordinary practice is to pour it at once after it is skimmed. If the castings are satisfactory, the record of these test bars will be standard; if not, increase or decrease silicon by varying the proportion of irons until the castings are satisfactory, and then keep as close to this record as possible. You now know what you are making, and make a rule never to vary a mixture by more than one or two irons and not more than 100 pounds of each at one time. If you wish on account of price to change one or more of your irons, order a carload and put 100 pounds on each charge instead of the iron you wish to abandon. If shrinkage rises, the silicon in the new is not as efficient as in the old iron, and if you use it you will have to get the silicon necessary to restore shrinkage from some other iron. If shrinkage goes down, the silicon of the new iron is more efficient than the old, and you can increase your scrap or other low silicon iron.

In the purchase of coke, if you wish to tell which is best, have the sulphur in your casting determined before you make any change. Then, without making any change in iron mixture, substitute another coke and get sulphur determination of casting. After a few trials you can tell which coke imparts most sulphur to your iron, and this analysis is better for you than any determination of sulphur in coke, which is rarely satisfactory. Or you can simply rely on your test bar record, which will tell you which coke makes the best casting without any worry about why. This is really using chemistry in the foundry, but in a simple, practical way, dealing only with results.

T. T. Marrell, formerly chemist to the Cambria Iron Company, then addressed the meeting, and described his new open hearth furnace. In the course of his remarks he touched upon some of the general principles which govern the handling of gaseous fuels and the principles of combustion.

C. E. Buzby of Philadelphia then addressed the meeting on the subject of

"Machine Tests."

In the course of his remarks he said: "The great value of the testing machine, not only in the iron foundry but in all classes of structural manufacture, is to be found in the substitution of real for theoretical values. In most formulas used by engineers a value is assumed for the material in question, sometimes based on very vague data, and varying, perhaps, several thousand pounds from the weakest to the strongest. In this case an average is generally selected, which will bring the result somewhere within reason. When this result is combined with a factor of safety we are still in doubt as to whether the result involves an excessive or inadequate factor. Judging from the price at which some castings are now delivered we might readily expect that the average calculation would be far in excess of the real strength, and, in fact, involve a doubt as to whether the product is mainly iron or cinder. How much better to deal with accurate figures, test the actual strength of castings from each heat by using specimens of a reasonable size, and secure a known value for your product independent of

hearsay and text books. The growth of this tendency toward accurate, positive results is very marked, particularly among iron founders. The transverse test, combining the load with the deflection, has generally been selected as the ordinary standard. This is no doubt owing to the cheapness of the machine, and, perhaps, to the fact that cast iron is so much used for frame work and subjected to transverse strains, while the tensile strains are allotted, if possible, to rods and bolts. The tensile strength of a bar of 1 square inch of cross section being eight to ten times that of a 1 inch square bar, tested transversely 1 foot between supports, involves a machine of eight to ten times the capacity and consequent increased expense, for which manufacturers working on close margins of profit hesitate to pay.

"The tensile tests are, nevertheless, valuable. For this class of the test the form of the specimen becomes a matter of vital importance, as it becomes almost impossible to avoid a combined transverse strain owing to irregularity in the outline of the specimen. The form of specimen which accomplishes this purpose is of circular section throughout, has about 3 inches straight in the center, of, say, $1\frac{1}{2}$ inches diameter, or 1 square inch area, tapering outwardly toward the ends, the largest diameter being reached about $1\frac{1}{2}$ inches from the end, from which point it is slightly reduced, the largest diameter being, say, $1\frac{1}{2}$ inches, or in ratio of at least 2 to 1, as compared with the center. The outline of the specimen at the largest diameter is a curve of large radius, so that the first bite of the grip is at a tangent point, which insures its being pulled into the direct line of stress, and as the stress increases the length of hold gradually increases until sufficient to break the specimen. When these specimens are made in a properly matched flask we have always found them satisfactory in results. The large diameter should not be too near the end, or the curve radius too small, or the end will crush off before the center pulls apart. A square bar is invariably curved more or less, and irregularities along the sides or edges are apt to give cross strains, which reduce the value of the material.

"In the transverse machine the bars are rectangular and may be 1 inch square, 2 x 1 inch, &c., and lengths of 1 foot, 2 or 4 feet, according to specifications furnished by different departments. Ordinary comparative tests in the foundry are made to show: 1, The actual strength of iron made; 2, whether the iron is keeping up to standard, and, 3, whether cheaper mixtures will give satisfactory results as to strength and flexibility if they are otherwise sufficiently soft and workable.

"Most founders know the effect of excess of different ingredients, and a testing machine is a valuable check in experimenting with mixtures varying in their chemical properties."

Secretary Evans then stated that a "Question Box" had been arranged, the idea being that any member of the association might have the means of asking a question of interest to foundrymen in general, without presenting his name. Three questions had already been asked through the medium of the "box." One was "What is the longest time iron can be held in the cupola after the blast is on?" This question he thought could be readily answered by Mr. Glover.

Mr. Glover: I do not know that I can

tell you. I have never retained much in the cupola after it was melted. I have generally done my best to take it away.

The President: Supposing your fan broke down, or your engine, and the cupola was charged and lighted?

Mr. Glover: I have kept my furnace open an hour and a half, and run off the heat afterward. Even after running an hour I have done that; and I have gone as far as having the blast on and was wrecked in the afternoon, but got running again at 7 o'clock the next morning. I had at that time over 45,000 pounds in the cupola, and had just started to make iron, in fact had made one tap, when the shaft running to the fan broke. I drained it all off, took out the breast, pulled what iron I could away from the front, banked up, closed all the tuyeres tight, put a covering over the top of the stack and kept the cupola in this way until next morning. Repairs were finished about 7 o'clock and I ran the heat off, running over 60,000 pounds off that morning. We have repeatedly kept our furnace open an hour and a half. It often happens in a place like ours, where we do not have an engine to ourselves. We were on a train of other shafting and connected with another department, and could never tell when there would be a break down. At that time I was not using coke. I was using for my bed hard Pardee coal, good, heavy lumps, about 4000 pounds in the bed, so it kept pretty well. I do not think we could have kept up on coke. If a heat is kept back with coke an hour after charging, your bed runs down quicker than you would think.

Mr. Flag: In Bessemer practice, what is the longest known run of a cupola, and in such case what was the height of the tuyeres above the bottom of the cupola?

Mr. Babbitt: We have often run a cupola for a week. This week we are running a single cupola, melting about 150 tons per day. I do not know the height of the tuyeres from the bottom.

Secretary Evans: The next question is: "Does foundry coke improve, or is it impaired for cupola use, if held under cover for one year?" For instance, if coke is placed in a shed and kept out of the weather, at the end of a year will it have deteriorated in value? Can any one answer this from experience?

Mr. Glover: I saw a representative of a big concern yesterday who told me they had 300,000 tons in their yard. If they carry that large stock on hand, they must think it will keep.

Mr. Babbitt: It might take in considerable moisture, and would require that much more fuel to drive off the moisture when the coke was required for use.

The President: There seems to be no reason why coke should deteriorate with age.

Secretary Evans: The next question is, "How would open hearth practice work for gray iron, and what effect would it have in improving low graded and black?" We are told by Mr. Morrell that this practice would be more expensive for gray iron, for the reason that small heats might be required, and they are more easily managed in the ordinary way.

No answer was obtained to this question.

Secretary Evans then read a letter from the Birmingham Iron Works, Birmingham, Conn., asking, "Are the crop ends of Bessemer steel rails as used in the mixture for casting rail rolls any better than tool steel scrap? If so, why?"

Justice Cox, Jr.: Rail ends will not bring as much money in the scrap market as the tool steel scrap, so I suppose the latter must be better or the former would bring a better price.

Mr. James: I think the question would be this, that in the rail ends the manganese would be high, probably 0.40 or 0.50. In the tool steel scrap the manganese would probably not exceed 0.10. It would therefore tend to whiten the metal.

Mr. Glover: Would it form a better chill on the roll than tool steel? That is, would it make a better surface on the chill?

Mr. James: Yes.

A paper by Prof. J. B. Johnson of Washington University, St. Louis, Mo., on the "Strength and Resilience of Structural Cast Iron" was before the meeting. It was deferred until the next meeting for reading.

Among those present were the following members:

Francis Schumann, Tacony Iron & Metal Company, Tacony, Pa. Thomas Glover, Glover Bros., Frankford, Pa. Hy. Ruhland, Hy. Ruhland & Co., Philadelphia. P. D. Wenner, Mellert Foundry & Machine Company, Reading, Pa. Josiah Thompson, J. Thompson & Co.; E. E. Brown, E. E. Brown & Co., Philadelphia. T. B. Harkins, T. B. Harkins Foundry Company, Bristol, Pa. Robt. Regester, J. Regester & Sons, Baltimore, Md. G. A. Davies, Lee, Chamberlain & Co.; Dr. Kirk; W. H. Pfahler, Abram Cox Stove Company; J. Ditto, Rogers, Brown & Warner; C. T. Holbrook, Juniata Furnace & Foundry Co.; Thos. Pote, Bement, Miles & Co.; Thos. Devlin, Thos. Devlin & Co., Philadelphia. Mr. Talbot, chemist Pencoyd Iron Works, Pencoyd, Pa. J. M. Warner, Rogers, Brown & Warner; Asa Whitney, A. Whitney & Sons; S. G. Flag, Jr., S. G. Flag & Co., Philadelphia. L. S. Wright, Camden Iron Works, Camden, N. J. Charles James, chemist W. Disston & Sons, Philadelphia. C. M. Ryder, furnace builder, Chester, Pa. Mr. Lewis, Ferris wheel; Wm. Hanson, Pennsylvania Iron Works; J. L. Jones, chemist Wm. Cramp Shipbuilding & Electric Works, Philadelphia. Mr. Babbitt, chemist Wellman Iron & Steel Company, Thurlow, Pa. W. C. Henderso, chemist Thomas Devlin & Co.; T. T. Morell; E. C. Buzby, superintendent Rieh'e Testing Machine Company, Philadelphia. G. A. Messick, Pusey & Jones Company; J. S. Stirling, Harlan & Hollingsworth Company, Wilmington, Del. Mr. Prizer, Orr, Painter & Co., Reading, Pa. A. C. Mott, Abram Cox Stove Company, Philadelphia. Thomas Sedons, president Sloss Iron & Steel Company, Birmingham, Ala. Justice Cox, Jr., Justice Cox, Jr., & Co.; H. Bancroft, Wm. Sellers & Co.; Howard Evans, J. W. Paxson & Co.; J. Hy. Popper, *The Iron Age*, Philadelphia. W. H. Daly, *Iron Trade Review*, Cleveland, Ohio.

Secretary Herbert, accompanied by Commodore Sampson, chief of the Naval Bureau of Ordnance, was in Philadelphia last week, where he inspected the navy yard at League Island as well as Cramp's shipyard. The Secretary and Commodore Sampson then proceeded to Bethlehem, in order to visit the ordnance plant of the Bethlehem Iron Company. After a general inspection of the work under way for the new war vessels, the visitors saw the 125-ton hammer at work, and investigated the process of Harveyizing steel plates. A hollow forged propeller shaft for the

"Brooklyn" was tempered in their presence. In another department a water hardened heavy plate for the "Texas" was tempered. A 17-inch plate for one of the barbettes of the "Massachusetts" was next bent, after which a diagonal plate for the "Iowa," was forged under the big hammer. From there the party went into another department, where the new 14,000-ton forging press was seen at work and a side armor plate for the "Massachusetts" was forged. Secretary Herbert, who, during his stay at Bethlehem was the guest of Lieutenant W. H. Jaques, expressed himself as being more than pleased with the progress of the work.

Southern Pig Iron Freights.—The Queen & Crescent Route has issued east bound pig iron tariff No. 6, effective April 2, giving rates on pig iron in carload lots from Southern furnaces to the following points:

To	From Dayton and Rockwood, Tenn.	Chattanooga, Tenn.	Rising Fawn, Ga., and Fort Payne, Ala.	Birmingham district.
Connecticut (all points).....	\$4.50	\$4.50	\$4.75	\$5.00.
Wilmington, Del.....	3.70	3.70	3.95	4.20
Maine (all points).....	4.50	4.50	4.75	5.00.
Baltimore, Md., (rail and water).....	3.90	.....	3.86	3.86
Baltimore (all rail).....	3.50	3.50	3.75	4.00
Washington, D. C.....	3.51	3.51	3.76	3.76
Massachusetts (all points; all rail).....	4.50	4.50	4.75	5.00.
Boston (rail and water).....	4.40	.....	4.36	4.36
New Hampshire (all points).....	4.50	4.50	4.75	5.00
Elizabethport, N. J.....	4.10	4.10	4.35	4.60
* Jersey City (rail and water).....	4.05	.....	4.01	4.01
Jersey City (all rail).....	4.10	4.10	4.35	4.60
Albany, N. Y.....	4.03	4.00	4.25	4.50
Elmira, N. Y.....	3.50	3.50	3.75	4.00.
Lockport, N. Y.....	3.30	3.39	3.55	3.80
† New York (rail and water).....	4.05	.....	4.01	4.01
New York (all rail).....	4.10	4.10	4.35	4.60
Rochester, N. Y.....	3.30	3.30	3.55	3.80
Syracuse, N. Y.....	3.50	3.50	3.75	4.00.
Troy, N. Y.....	4.00	4.00	4.25	4.50
Utica, N. Y.....	3.80	3.80	4.05	4.30
Allentown, Pa.....	3.70	3.70	3.95	4.20.
Chester, Pa.....	3.70	3.70	3.95	4.20
Harrisburg, Pa.....	3.50	3.50	3.75	4.00
Lancaster, Pa.....	3.70	3.70	3.95	4.20
Philadelphia (rail and water).....	4.05	.....	4.01	4.01
Philadelphia (all rail).....	3.70	3.70	3.95	4.20.
Pottsville, Pa.....	2.70	3.70	3.95	4.20
Reading, Pa.....	3.70	3.70	3.95	4.20
Scranton, Pa.....	3.70	3.70	3.95	4.20.
Rhode Island (all points; all rail).....	4.50	4.50	4.75	5.00
Providence, R. I. (rail and water).....	4.40	.....	4.26	4.36

* In addition to above charge the cost is as follows: In lots of 50 tons and less, 60 cents per ton; over 50 tons, 50 cents per ton.

† The above rates cover pier delivery only. Additional charge within lighterage limits is as follows: In lots of 50 tons and less, 60 cents per ton; over 50 tons, 50 cents per ton.

It is announced that the Minnesota Canal Company, who propose to furnish to Duluth 200,000 horse-power for the operation of mills and factories by the construction of a canal from a point on the St. Louis River, 12 miles above Cloquet, to Duluth, Minn., are about ready to begin operations. W. E. Darwin, a contractor who has done much work on the Mesaba range, is, it is said, also to become interested in the enterprise and will act as superintendent of construction. He will be ready to let contracts May 1. The company will build 33 miles of canal 40 feet wide. The work will require two years and will cost \$3,000,000.

Compulsory Labor Insurance.

Under somewhat extraordinary circumstances Germany took the initiative in a movement whose course has been watched with keen interest. The sentimentalist in economic matters has hailed its advent with delight and never tires of the prophecy that every civilized nation must soon follow suit. Even if that were to prove true, so far as Europe is concerned, we doubt whether in this country compulsory insurance against sickness, accidents and old age will come in this generation. Americans know too well that a certain amount of brutality must always characterize our industrial system, and that governmental interference to gloss it over will not succeed. Even if the possibility of our dealing with it be very remote indeed, thoughtful Americans will read with great interest an admirable volume by John Graham Brooks, entitled "Compulsory Insurance in Germany." It has been prepared under the direction of Carroll D. Wright, Commissioner of Labor, and issued by that department.

We have always been told by Germans that the compulsory insurance laws were the results of a desire to head off the growth of socialism, an effort which has ended in complete failure so far as that special aim is concerned. There are three of these laws, all based on the general principle that it is the business of the State to look after the welfare of those who are weak or unfortunate. The first makes it compulsory for all workmen to insure themselves against sickness in one of a number of associations. Toward the close of 1891 there were enrolled 6,329,820 members, among whom there were 2,397,826 cases of sickness, lasting 40,798,620 days. The contributions of employees and employers and the initiation fees amounted to \$23,028,315, the latter being forced to pay half the amount raised by the men. The expenses were \$23,520,507.

The second law relates to insurance against accidents, under which the employers are forced to enter associations, which pay for the relief of injured workmen, and are forced to accumulate reserve funds equal to twice their annual outlay. During the first 13 weeks of illness the sick insurance fund takes care of the victims.

The third law deals with compulsory insurance against old age and invalidity, there being now about 7,300,000 men and 3,100,000 women so insured. The insured, his employer and the State all contribute equal amounts to the fund from which pensions are to be paid. Each workman must paste every week into a book kept for that purpose special stamps representing his contribution. The administration rests in the hands of a directing board consisting of five representatives each of the employers and of the insured. Four wage classes are established, according to the earnings, the first paying 3.33 cents per week during the first contributory period of ten years, the second 4.76 cents, the third 5.71 cents and the fourth 7.14 cents.

Through the whole series of laws runs the tendency to place upon the employers a maximum of burden which the widest interpretation of his responsibility will tolerate. It has been pretty plainly stated by German manufacturers to Americans that these provisions were imposed upon them as an offset against

the moderate protection which they enjoy, and that opposition was silenced with the threat that a lowering of the tariff would follow.

Mr. Brooks deals at length with the opinions in Germany among workmen and employers on the State insurance. Manufacturers complain of the accident law because it has called into being new and elaborate machinery of organization and has imposed heavy burdens. The men criticize it on the ground that employers have altogether too much power in its administration. Since they contribute nothing to the funds and yet have representation this looks ungracious. The interest of the men lies in the fact that during the first 13 weeks the injured are taken care of by the sick fund, to which they are contributors. To the sickness law, Mr. Brooks says there is only slight opposition. On the whole the workmen generally show a good deal of indifference to these two laws with the benefits of which they have such constant experience and knowledge.

There is a good deal of opposition to the old age and infirmity law among the men. They object to the troublesome stamp system, and express disgust at being forced to pay during their whole lifetime in order to earn a pension at the age of 75 years. Mr. Brooks expresses surprise that so little apparent effort has been made to bring the emphasis in the discussion off the old age factor and on to that of the infirmity feature, since it must play so large a part under the law. The infirmity pension is paid regardless of age, if the workman is incapable of earning one-third of his usual wage and has passed his five years' "waiting time." The infirmity pension, besides, is higher than the old age pension. Up to July 1, 1893, since the passage of the law 245,013 persons applied for old age pensions, of which only 193,114 cases were allowed. In the same period invalid pensions have been claimed by 59,247 persons, of whom 34,746 were allowed and 15,938 were refused. In 1891 there were paid to 132,917 old age pensioners \$3,643,007, or \$27.37 per person.

It is not quite clear what relation the German State insurance laws bear to wages, at least so far as the sick and accident acts are concerned. As for the old age and infirmity contributions, Mr. Brooks acknowledges that it is very widely and commonly true that the employers have to pay not only their own contributions but those of their laborers and servants also.

One startling fact is brought out by Mr. Brooks, and that is, the alarming growth of the practice of playing sick under the insurance laws. The evidence of physicians strongly emphasizes the prevalence of simulation, which in many cases cannot be detected, and which is encouraged to some extent through the leniency and inexperience of younger physicians anxious to build up a practice.

Mr. Brooks draws the following general conclusions from his study of the German insurance laws:

"Perhaps the strongest impression left upon the student of this legislation is a certain helplessness about drawing any general conclusions as to economic results thus far achieved. The commonest reply, both to criticisms and to inquiries is: 'There has been too little experience. We must wait some years still before the more weighty results can be known.' The relations to wages, charity, socialism, savings, and cost of living all present the same type of

difficulty. Too many and far too important other factors are present as active forces to enable one to trace cause and effect with any approach to accuracy. Certain confident claims that were made by the early leaders in this legislation are not only not fulfilled, but there is scarcely a sign that they will be.

"1. In the sense in which Bismarck used the word, there is little likelihood that the laborers will be made contented by the laws.

"2. The hope that certain classes of the insured would the more readily go into the country from the city or stay away from the city (as their money would go farther in the country), shows no hints of being fulfilled.

"3. That the social democracy has been in the least harmed or checked in its propaganda very few would claim.

"4. Whatever may be true in the future as a result of these laws the charity burden has not been lightened in any way corresponding to the belief of many advocates of the insurance.

"5. As to the belief entertained by many that the laborer would be led through the influence of these forced contributions to learn the habit of saving it is quite certain that no such results could as yet be brought forward.

"6. That a better feeling has in consequence been brought about between employer and employed is upon the whole questionable, although this (under many circumstances where the groups are not too large) is affirmed to be true."

Discussing the moral results, Mr. Brooks says: "That a great deal of actual misery will be diminished as a result of these efforts is quite certain, even if an enormous expense is thrown upon the whole body of consumers, and a relatively large part of that burden comes upon the working classes. In other times it might not have been worth while to pay so much for the relief of a certain kind of poverty that springs from economic insecurity, but the time has at last come when the mere presence of such want is a distinct social danger. Public opinion is far more sensitive to its existence. More than this, the social agitator draws his only really effective weapons from this source. His chief impeachment against society is based for its justification on the concrete facts of the kind of suffering that may be traced to insecurity as to means of livelihood.

"The whole elaborate scheme of the German social legislation of which the three insurance laws are the most daring features, is sure, it is claimed by its friends, to decrease many of the most glaring and irritating miseries connected with poverty among the working classes. In the writer's opinion this will be brought about far more through the moral and educational influences that will slowly and indirectly act upon their object than by any present working of the actual mechanism of these laws.

"The chief moral effect will be in the increasing sense of solidarity which the very attempt to make the laws succeed will intensify and increase.

"If the laws have eventually to be abandoned this result would remain. This quicker sense of 'social oneness' is apparent in the press, in public speeches, in university lectures, in countless volumes upon every phase of the so-called social question, as well as in the philosophical and ethical treatises.

"Here is a force far too considerable

to be measured by any merely economic estimate.

"In expressing this belief in ultimate results that are essentially extra economic it is not forgotten that the principle of self help is put by these laws to much risk. It is bad that the free, friendly associations should be made to suffer as they unquestionably are by this form of State competition, but the evidence is overwhelming, that society is unwilling to wait for the self help institutions to deal with social ills."

The development which would naturally occur to Americans, who generally look to individual effort or voluntary corporate organization for the attainment of results, is discussed as follows by Mr. Brooks:

"If self help should finally have a far larger extension, this legislation of universal compulsory insurance for the working classes will have gathered and classified an experience and a body of

1, The method of self help which sprang from the older English liberalism; 2, the method of State socialism, which holds that industrial conditions have so changed as to demand a constant enlargement of State activity in order that the mass of workers may have secured to them more hopeful conditions. It is not enough to cite long lists of State blunders in the past. The representatives of the people are learning their lesson and already an imposing body of experience is at hand, which leaves no doubt as to the possibility that the State, commune or city can and will in the future perform certain services for society better than private corporations or private persons. Germany, chiefly because of the character of her people and partly because of the disciplinary influence of her army and school systems, has produced a body of officials rarely equipped for so vast and hazardous an undertaking. She is trying

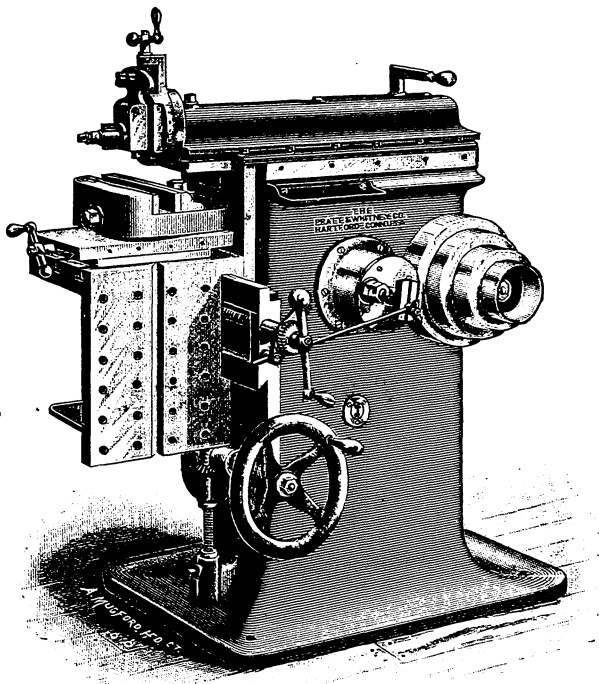
inexperience; they are made by a large body of the ablest and most practically experienced men that Germany possesses. Even if partial success follows this experiment it will have furnished evidence of inestimable value upon questions that now baffle all except the infallible."

The Pratt & Whitney Pillar Shaper.

The ram of the pillar shaper here illustrated, built by the Pratt & Whitney Company of Hartford, Conn., and 136 Liberty street, New York, has a 15-inch stroke and is capable of doing accurate work to its full advertised capacity of 14 inches. The ram is very heavy and the machine is powerfully geared. It is adjustable from its extreme travel to any less distance and can be adjusted instantly from the outside by a graduated nut. It has a quick return motion and uniform forward motion. The cross feed is automatic and adjustable. The machine is provided with a universal graduated vise. The elevating screw for the vertical slide has a ball bearing thrust collar, which makes it easy to raise and lower the slide. The greatest distance between the top of the table and bottom of the ram is 11½ inches, and the traverse of the table is 16 inches. The weight of this size of this machine is 2100 pounds.

San Francisco News.

One of the signs of the times here is a reduction of wages by the Union Iron Works, the first that has been heard of here in a long time. The reduction goes right through the whole list, from the principal foreman of a department down to the lowest workman. The Union has had all along the reputation of having the best paid as well as the largest establishment of the kind in the West, so that the reduction is all the more surprising. The causes are the bad times and the heavy competition of the East, and it may not be improbable that the proposed new tariff may have had something to do with it. As the foundry and shipworks employ at times from 1800 to 2000 men, it may be seen that if it were running full handed the saving would be very large in the course of a year. One thousand men at 50 cents a day would mean the saving of \$500 a day, \$3000 a week, or \$156,000 a year. This would make a very nice profit for the stockholders. The cut is in the main 50 cents a day, those receiving \$4 per day being cut down to \$3.50; those receiving \$3.50 to \$3; those receiving \$3 to \$2.50 per diem; those obtaining \$2.50 per day to \$2. Laborers on \$1.75 per day are obliged to take \$1.50, and \$1.50 a day laborers have to be satisfied with \$1.25. The latter is a poor wage for California or elsewhere and shows plainly to what things are coming. Once, and not very long ago, the intimation even of an intention to do such a thing would have precipitated a long and bitter strike, but now it is accepted as a matter of course, and though not pleasant to the workers, not even a grumble is heard. The great molders' strike was started because the molders' union would not allow one to work faster than his brother workman. There can be no doubt that those establishments which have not already reduced wages will follow suit. The movement will, for one thing, enable the foundrymen to



THE PRATT & WHITNEY PILLAR SHAPER.

statistics indispensable for a society in which private and individual forces can act wisely for ends larger than their own. The limit of the self help institution is to day in the lack of adequate public opinion to give direction and energy to voluntary action for the general welfare. Such public opinion is making under these insurance laws. Or if society is to have, as now appears, a far larger socialistic growth, these laws will furnish each year both training and facts, without which larger State and city control could not be efficient.

"It may be urged finally that the work of an unfriendly critic would be easy if his strictures were confined narrowly to the material or mere cash side of the question. Such criticism would be easy if immediate results alone were considered. If, on the other hand, the deeper objects of this legislation are taken into account, the indirect and more distant moral and educational values, a far more hopeful judgment must be pronounced upon it. It cannot for a moment be forgotten that two widely differing methods of social reform are now competing in the field:

this experiment not for herself alone, but for the world. Probably into no social experience ever entered more conscientious endeavor or higher ability. Consciously or unconsciously the thing aimed at is the raising of the standard of living among the broad mass of humbler wage earners. Economic liberalism has always denied that this was possible through State action. This is, however, precisely the thing we are concerned to know. No one but a pedant would claim to know the limits either of self help or of State activity. The German experiment is furnishing evidence at the very points where we need it most.

"If the energies of self help should be found to suffer under this insurance scheme, its doom is certain. The advocates claim, however, that every essential of a vigorous individual initiative has been preserved. They refuse to admit that this State system is in any way opposed to self help, but is rather a means of securing real and independent action to the masses which present conditions do not allow. It should be remembered that these claims are made, not merely by theorists or persons of

compete more readily with the Eastern manufacturer. Then, should the new tariff bill admit pig iron, scrap and scrap steel at a very low rate, that will be another advantage which will place the odds in favor of San Francisco in competition for a long distance east of its present limits. The various enterprises which were projected during 1893 will perhaps begin to materialize. Then, too, our nail works may start up again and our rolling mill operations once more be active as of yore.

At present they are very dull, and what is worse there is no appearance of a resumption of their activity. There is no special demand for iron work for building, and this used to be quite a feature of our industry. The demand for machines is very light at present writing, and though there are several quite important patents which have their location, as far as manufacturing is concerned, in this city, their owners fare no better than the others. The dullness in the lumber trade has prevented the saw manufacturing industry from being as active as it has previously been—in fact, dullness for the past year or so is described as being without precedent in the history of the industry. We have, it is true, another shipyard complete and perfect in all its appointments and ready to turn out steel vessels the same as is the Union shipyard, but there seems to be no call for it at present. All this is not especially encouraging, but it is a true picture of the iron manufacturing industry in San Francisco at date; nothing extenuated and nothing set down in malice.

As to general trade in the hardware and iron business, there is a slight improvement over the condition of things noted in my last report. There is a slow but steady increase in the volume of sales from day to day. The only cloud at present existing is that arising from the lack of sufficient rain in the San Joaquin Valley and Southern California. There is irrigation in some portions of the section, but not in all, and those in the unirrigated portion are already beginning to complain loudly. The distribution of these lines of goods from this city for the past two weeks have been larger than previously this season, but there is not much volume of trade even then. We may say, though, that the outlook is fully as good as it was last season at this time. In fact, it may be said to be much better, as we have been down to bed rock, and an improvement is to be expected in the natural course of things. Some of our leading men believe that we will have a good trade—others worry over the tariff and its probable results on business. But needed supplies have to be laid in, and this will make a considerable draft on stocks on hand without taking the state of the market in any other respect into consideration.

The first armor piercing shell of 13 inch caliber yet made will shortly be tested at the naval ordnance proving grounds on the Potomac. It is made of steel, forged by the Wheeler-Sterling process. The target will be a 17 inch nickel steel plate from the Carnegie Works, the heaviest yet made for the Government.

The next meeting of the Western Foundrymen's Association will take place on Wednesday, April 18, at 7.30 p.m., in rooms 702-703 Temple Court Building, 225 Dearborn street, Chicago. A paper by Thos. D. West will be read.

THE WEEK.

The Indiana Board of Health has ordered the vaccination of all tramps found in the State.

The Canadian Minister of Public Works has entered into an agreement with the contractors by which they will complete the new Canadian Canal at Sault Ste. Marie by July 1, 1894, for an additional grant of money.

During last year 27,547 vessels entered and cleared at Canadian ports, as against 30,961 in 1892 and 31,321 in 1891. The total tonnage, however, last year was but little less than that of 1892, which was the highest in the history of the Dominion. It was 10,608,611 tons. A growing tendency is noted toward the construction of larger vessels every year. The number of vessels built in Canada in 1893 was 313, an increase of 35 over the previous year. As evidence of the decline in shipping values, however, it is noted that their average selling price has fallen from \$37 per ton in 1868 to \$11.50 per ton in 1893.

The shareholders of the Panama Canal Company, at a recent meeting in Paris, appointed a committee to establish a new company for the purpose of completing the canal.

Less cotton is being planted this year in the South, but more attention is being paid to cereals and other food products.

The Naval Board that has been investigating the feasibility of converting the whaleback type of vessel into an auxiliary cruiser for war purposes has reported to the Department that these vessels are unsuited to the purposes of warfare on account of the impossibility of mounting heavy ordnance on board of them. The inventor and builder of the whaleback ships believed that it was possible to convert them into formidable coast defense vessels in time of war, but it is shown that only light rapid fire or machine guns could be carried on account of their light construction and limited deck space.

Philadelphia is to spend some \$14,000,000 this season on city improvement work of a permanent character. This includes a subway for the Reading Railroad, miles of new street pavement, a better sewerage system, &c. This work will furnish employment for some thousands of the unemployed in the coming months.

Railroads in the West and Southwest are beginning to report increased earnings. This is regarded as a promising sign of recovery in those sections of the country where the late depression was most pronounced.

The approaching consolidation of some of the largest Chicago packing houses is stated to be a fact.

In an address given before the New York Chamber of Commerce last week Edward Atkinson, the Boston statistician, predicted a revival of trade activity after the first of July. He considers the present dullness to be a purely artificial depression and paralysis of industry, wholly attributable to the incapacity of legislators. Therefore, he does not think it will have anything like the effect, in point of duration, as compared to the ordinary commercial crisis which is brought about by the over building of railroads, over

speculation in land, or some of the ordinary causes of financial stress.

March's failures in the United States were less than half, in number, compared with those of January last, while the proportion of capital involved was still smaller.

Fears are entertained of a commercial crisis in Buenos Ayres, owing to the heavy losses sustained by the country through the prolonged drought and the low prices of produce.

According to the reports gathered by the *Journal of Commerce*, the fire losses of the United States and Canada for the month of March show a gratifying decrease. They were in all \$9,147,190, or over \$2,000,000 less than those of February, and considerably below those of the corresponding month of 1892 and 1893.

While Coxey and others are marching on Washington with their hosts of "the unemployed," the farmers in the Eastern part of the country are crying out for more help, and the Free Immigrant Labor Bureau in New York announces that it is unable to meet the demands upon it for laborers. In the West, too, a similar condition of things prevails; prices for farm labor are higher than ever and the supply is inadequate.

Economy of Superheated Steam.

The economical advantages of superheated steam in small motors were shown by tests of a Serpollet motor conducted by M. Seguin. The motor had a single horizontal cylinder, 5.1 inches in diameter by 5.1 inches stroke. The cut-off was fixed at 66 per cent. of the stroke; the admission pressure was 58 pounds per square inch, and the revolutions 284 per minute. The brake horse-power on a four hours' trial averaged 4.57 horse-power, and the steam consumption was but 29.87 pounds per brake horse-power per hour. Comparing this result with those obtained with somewhat similar sized motors at the Plymouth trials of the Royal Agricultural Society, it will be found that the best engine there, a compound one, took 35.75 pounds of steam per indicated horse-power, while the best of the single cylinder engines took 57.75 pounds of steam per indicated horse-power. Practically the whole of the advantage shown by the Serpollet motor must, says *Engineering*, be credited to the boiler, which supplies superheated steam. This boiler consists of a stout tube flattened so as to deform the passage through into a narrow slit. This tube is coiled and has one end connected with a feed pump, and the other with the engine to be driven. The boiler used in the above tests had a heating surface of 26.8 square feet, and the grate area was 2.9 square feet. The steam, though showing on the gauge a pressure of 58 pounds per square inch only, had a temperature of 1009° F. on issuing from the coil, which had fallen to 572° F. at the steam chest. The temperature of saturated steam at 58 pounds pressure is about 306° F., so as used in the engine the steam was superheated by some 266°. The output of steam was just 4.9 pounds per square foot of heating surface per hour. The fuel used was briquettes having a heating value as tested in a calorimeter of 8.28 pounds of water evaporated from and at 212° F. per pound of fuel, and as used in the boiler the efficiency was 67.3 per cent.

The Iron Age

New York, Thursday, April 12, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - BUSINESS MANAGER.

The Revenue Under the Proposed Tariff

In all the discussion of the proposed changes of the tariff, in and out of Congress, we have not observed any reference to one important matter which should be clearly brought out. The text of the Wilson bill as it emanated from the majority of the Finance Committee of the Senate contains, as an appendix, a series of tables, giving in detail the quantity and value of merchandise imported during the fiscal year ending June 30, 1893, the amount of duty collected, and the duties estimated under the House and under the Senate bill.

The practice of Treasury officials who usually supply these figures has been to take the average importations for a series of five years, and figure the duty obtainable under a proposed new rate on the average quantity or value thus ascertained. In the tabulation in question even the unsafer basis of one single year has been chosen, although a greater number were available. When the changes are not important such a method may lead to fairly accurate results. But when radical reductions are under consideration it is manifestly an absurd system of figuring probable revenue.

It is clear that if duties are lowered foreign producers can supply an increasing proportion of the requirements of our markets, and in very many lines a reduction down to a certain point might surrender the whole of it to them. Let us illustrate the point by an arbitrary example. The consumption of pig iron in this country in normal times is, say, 9,000,000 gross tons, and under a duty of \$6.72 per ton importations to the extent of 50,000 tons yield a revenue of \$336,000. Let us suppose that at a rate of, say, \$1 per ton the importations would run up to 2,000,000 tons. That would yield a revenue of \$2,000,000. But according to the method of figuring of the Treasury officials the revenue would be cut down to \$50,000.

Let us take a specific case. The importations of iron ore in the fiscal year amounted to 677,301 gross tons, which under the specific duty of 75 cents yielded a revenue of \$507,976. The Senate bill places the duty at 40 cents, and the Finance Committee promptly enters the revenue available at \$270,920, a loss of revenue of \$237,056, when it is very possible that the importations might be easily doubled, and an actual increase might take place.

American manufacturers claim that under the reduced duties they would be forced to surrender a part of their markets to foreign producers and that to that extent capital and labor in this country would lose profitable employment. Yet that important point is utterly ignored by those who attempt to estimate revenue, and additional burdens in the form of an income tax are imposed. We are willing to admit that it is very difficult indeed to make any estimates based on scientific principles of the revenue collectable under new duties, but we must insist that the system followed and gravely carried out to the last cent yields utterly valueless totals. We feel convinced that no one familiar with the iron and metal trades will deny that, outside of tin plate, there will be so much heavier imports under the proposed duties that the revenue will be actually greater. Yet the duties on the metal schedule, outside of tin plate, which were \$13,502,577.75 in the fiscal year 1892-1893 are cut down in the House bill to \$8,405,492.02 and in the Senate bill to \$8,418,513.38. As aggregates arrived at by computing the future revenue on the basis of importations made under a protective tariff such figures are an unsafe guide in estimating the finances of a great country. They neglect the most important claim made by American manufacturers with every show of reason and justice on their side that a lowering of duties will greatly encourage importations.

Puddled Iron in Great Britain.

For some years past all attempts to gather figures which give numerical expression to the decline in puddling have ceased in this country. Formerly the quantities of iron and steel, in finished form, were separately reported. Special interest attaches, therefore, to the English statistics of the production of puddled iron, since they serve to indicate how largely steel has crowded out iron. The following table, issued by the British Iron Trade Association, shows the production of puddled bar, or muck bar, as we call it, for a series of years:

Production of Puddled Bar.		
Year.	Production. Gross tons.	Decrease on previous year. Gross tons.
1889.....	2,253,756	.....
1890.....	1,923,221	330,535
1891.....	1,733,902	189,319
1892.....	1,560,697	172,205
1893.....	1,363,974	196,723
The maximum of production of puddled bars was reached in 1882, when the output was 2,841,534 tons. Comparing that year with 1893, we have the following data relating to the changes which have taken place in the position of iron and steel, the figures being thousands of tons:		
Puddled iron.....	1882. 2,841	1893. 1,364
Bessemer ingots.....	1,673	1,493
Open hearth ingots.....	436	1,400
Totals.....	4,950	4,257

The maximum production of Bessemer steel was in 1889, when it reached 2,140,791 tons. The table shows that while in 1882 puddled iron constituted 57 per cent. of the whole output, it was only about 30 per cent. of the whole in 1893.

Statistics are presented which prove that while in 1877 there were 9159 puddling furnaces in Great Britain, the number had dwindled down to 3535 in 1893. Of the latter only 2350 worked in that year, and very many of even those were only partially occupied.

The British Iron Trade Association collects returns of the production of different descriptions of finished iron, which, however, are not absolutely complete. The aggregate is given as 1,249,141 tons, which, the report says, "after allowing for loss in conversion is more than would be obtained from the tonnage of puddled bar produced, but the excess may be due to the working up of other iron or to the utilization of stocks of puddled bar." It seems to us that the use of scrap and old rails would account for an even greater excess. The production of different kinds of finished iron was as follows:

	Tons.
Rails.....	10,631
Ship plates.....	115,586
Boiler plates.....	31,534
Sheet iron.....	186,892
Nail rods.....	9,541
Bar iron.....	293,489
Angle iron.....	107,902
Hoop iron.....	100,321
Tee iron.....	43,064
Wire rods.....	61,668
Strips.....	67,298
Rounds and squares.....	95,819
Other iron.....	135,196
Total.....	1,259,141

One matter in the report from which we quote strikes us as very curious, and that is the absence of any data on tin plates. The whole production of puddled bars in South Wales was 31,689 tons in 1893, and the details of the production of different shapes account for 28,091 tons. This would indicate that very little puddled iron is used in tin plate manufacture. Yet the statistics relating to steel record only a production of 296,843 tons of steel bars, tin plate bars and forgings. It looks, therefore, as though the figures of the British Iron Trade Association were not complete, so far as this particular industry is concerned.

Railroad Advantages (?)

The proposition seems almost indisputable that a town with five railroad lines diverging from it is in better shape for business than a town with only two. A town with 25 lines would seem to be incomparably better fixed than one with only two or three lines. Strong arguments on the relative advantages of cities for the location of manufacturing establishments are predicated on the possession of numerous railroad lines. The logic of the situation would appear to be entirely on the side of the greater railroad center. It is assumed naturally that the greater the number of lines, the greater the competition for business, and, therefore, the more certain should a

shipper feel that his interests would be fostered. In fact the impression quite generally prevails that if a manufacturer can reach even two or three lines of railroad their representatives would cater to his wishes and cultivate his trade and his friendship. But many of our readers have found to their chagrin that this apparently easy problem does not work out that way.

The situation of the Chicago manufacturers forms a case in point. Here is a city with more separate railroad lines diverging from it than are owned by any other city on the planet. They are so numerous that they are almost invariably alluded to indefinitely, as somewhere about 25 to 30. Parallel roads run from Chicago to nearly every trade center in the country and sometimes there are three or four competing lines to a neighboring city. In the vicinity of Chicago should be an ideal location for manufacturing interests. Fuel and other raw materials should be delivered by these various lines at very low rates, and manufactured products should be transported to points of consumption at correspondingly low rates. The topography of the surrounding country is exceedingly favorable for railroad building and economical railroad operation, being remarkably level for hundreds of miles in any direction. It can hardly be termed a moderately rolling country, but is for the most part as level as a floor. Locomotive fuel is cheap, perhaps as cheap as anywhere in the country. And yet, with all these natural endowments the Chicago railroads do not treat their clients as well as roads in other sections of the country in which fuel is dearer and a broken country causes railroad building and operation to be very much more expensive.

Allusion has previously been made to the indifference of the Chicago railroads toward their immediate customers, as shown in the very slight reduction of rates which followed the slashing cut made by Eastern lines some two or three weeks since. When some of the manufacturers appeared before the Freight Association to argue for a reduction on their raw material freights and on rates on manufactured products to points further west, they were asked how many thousand cars they could furnish in a month to the various railroads in the way of additional traffic if rates were lowered. They informed the railway magnates that very few manufacturing industries at present were in such shape that trade could be reckoned by the thousand cars, and that buyers generally were ordering by the single car and considered themselves heavy purchasers at even that rate. They would appear from this to have been treated with scant courtesy. They are therefore asking one another what great advantages a city derives from the possession of numerous railroad lines. Perhaps in making it a dumping ground for the products of other sections. This view is emphasized by the drop in Southern

pig iron rates at the beginning of the current month, when Chicago lines accepted their *pro rata* of the reduction made, but refused to grant the same rate on business hauled southward, on account of local furnacemen. It is evidently better for a manufacturer to be located on a single railroad line, which will scrupulously cultivate his interests. This is the only view to take of such a situation.

New Tools in Dull Times.

The fact that machine tools of good, bad and indifferent design and quality are now cheaper than they ever have been, appears to have had but slight effect on the market when we consider the output that is possible. The majority of the builders are running their works on reduced time and with fewer hands, although trade is better now than it was early in the year. The attempt has been made to force the market by reducing prices to the lowest limit. This has been accomplished by lessening expenses in every direction and by being content with smaller profits, and in some cases abandoning profit entirely. And yet the demand is not what it should be.

That during the past year thousands of tools have been worn out, or at least so worn that they would, under ordinary conditions of trade, be replaced by new ones, cannot be disputed. Nevertheless those needing new tools and those who would be purchasers under more auspicious circumstances are not investing in new machinery. They are making their old machines do the work. That this seriously affects the cost of their product, no matter what that product may be, is not appreciated as it should be. They are strenuously endeavoring, in every way in their power, to reduce the cost of production, and at the same time they keep in their shops tools which should go to the second hand dealer or to the scrap heap. They agree with the statement that this policy adds to the cost of manufacturing; and they well know that prices will jump just as soon as trade returns. Some firms are taking advantage of the market and re-equipping their plants, but the vast majority are doing the best they can with the facilities at hand.

The question is one of great complexity and one possessing features of which it is impossible to estimate the true value. We will assume that the manufacturer has a tool he would like to replace with a new one. The old machine will bring less now because of the low prices prevailing, than it would months ago, therefore from this standpoint it is not proper to sell. But he can buy cheaper now than he could and also cheaper than he will be able to in the near future. The difference controls this factor of the problem. The new machine will do more and better work than the old one, and for this reason it should be obtained. But at present there is not

work enough on hand to keep the new machine running to its full and most economical capacity. The manufacturer cannot tell when trade will return in its full volume. His only resource is to strike a balance between the cost of the improvement and the advantages to be derived from the change. His own judgment must be his only guide as regards the unknown quantity—the time of the complete restoration of trade and its volume.

Factory Hours in England.

William Mather, Member of Parliament for the Gorton Division of Lancashire, and the senior member of the firm of Mather & Pratt (Salford Iron Works), has made a report of the experience of his firm in the first year's experiment of giving his employees an eight hour day instead of nine hours, without any reduction in wages. Mr. Mather, whose works employ a large number of hands, reports that the experiment has proved in every respect a complete success. The output of the works has been greater than ever before, without an increase of expense, despite the reduction of hours. The 1200 hands employed in the works have worked cheerfully in double shifts during times of pressure upon the works, due to large orders, but they have never been paid, nor have they expected overtime, the reduction of the regular hours and the retention of the regular wages offsetting that. Converts to the eight hour system, Mr. Mather says, have invariably been permanently won over. Mr. Mather has furnished the government with full details of the working of the experiment in the Salford Iron Works and recommends its adoption, even tentatively, in the government arsenals, dockyards and other public works.

Considerable improvement in the industrial situation is noted from Pottstown, Pa. The Potts Bros. Iron Company will start this week all their puddling furnaces, but the plate mill will remain idle for a short time. Eight of the 22 puddling furnaces of the Ellis & Lessig Steel & Iron Company will resume, the other portion of the plant being in operation. The Pottstown Iron Company will have more of their works in operation than heretofore. An increased output of iron was turned out last week. The bridge works of Cofrode & Saylor are running, with prospects brightening. The Valley mill of the Glasgow Iron Company will be running and more of the plant at Glasgow in operation than during the winter. The furnace of the Warwick Iron Company is in operation and has been without cessation. The boiler works of Sotter Bros. are reported very busy. Industries in other lines are also more active than in the recent past.

The scheme of constructing a bridge and railway across the channel, between England and France, is again receiving lively attention. A bill is now before the British Parliament asking for a grant for tentative works, in order to demonstrate the practicability of constructing and maintaining the bridge. Sir Benjamin Baker, on his way to Egypt recently, paid a visit to Paris and conferred with the French engineers interested in the matter. It is claimed in both countries that the scheme is perfectly practicable.

Increasing Pig Iron Production.

The resumption of work in a number of coke iron producing districts, and notably in the Chicago district, has carried the active furnace capacity higher than it has been since the great drop of last summer. In spite of this we are still 50,000 tons per week below the normal rate of production, or say close to 30 per cent.

On April 1 the active furnace plant, grouped according to fuel used, possessed the following weekly capacity:

Fuel.		
Anthracite.....	34	17,739
Coke.....	92	105,011
Charcoal.....	18	3,982
Totals April 1.....	144	126,732
Totals March 1.....	133	110,166

Increase or decrease..... + 11 + 16,566

The weekly product of all the furnaces on April 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
April 1, 1894.....	144	126,732
March 1.....	133	110,166
February 1.....	125	99,242
January 1.....	130	99,087
December 1, 1893.....	130	99,879
November 1.....	117	80,070
October 1.....	114	73,895
September 1.....	125	93,434
August 1.....	169	107,042
July 1.....	220	153,742
June 1.....	244	174,029
May 1.....	251	181,551
April 1.....	255	178,858
March 1.....	255	178,876
February 1.....	251	171,201
January 1.....	246	173,068
December 1, 1892.....	246	176,271
November 1.....	244	171,082

The status of the anthracite furnaces was as follows:

Anthracite Furnaces, April 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	18	1	699	17	6,043
New Jersey.....	11	2	1,153	9	3,691
Spiegel.....	3	1	67	2	170
Pennsylvania.....	44	10	3,453	34	12,490
Lehigh Valley.....	1	0	0	1	60
Spiegel.....	27	7	4,326	20	8,853
Schuylkill Valley.....	14	3	2,087	11	3,494
U. S. Susquehanna Valley.....	16	2	1,110	14	2,934
L. Susquehanna Valley.....	1	1	525	0	0
Spiegel.....	15	7	4,419	8	2,828
Lebanon Valley.....					
Totals.....	150	34	17,739	116	41,063

For a number of months past our records of active anthracite furnaces show the following:

	Furnaces in blast.	Capacity per week.
April 1, 1894.....	34	17,739
March 1.....	32	16,618
February 1.....	27	13,627
January 1.....	29	13,081
December 1, 1893.....	32	16,188
November 1.....	34	16,166
October 1.....	34	15,338
September 1.....	43	20,758
August 1.....	51	23,572
July 1.....	63	29,268
June 1.....	70	33,916
May 1.....	67	33,168
April 1.....	72	34,641
March 1.....	74	34,773
February 1.....	74	32,871
January 1.....	70	32,772
December 1, 1892.....	69	33,602
November 1.....	69	30,889

During March, Wharton, in New Jersey, and Lehigh, in the Lehigh Valley, blew out. One Bethlehem, Keystone of the Thomas Iron Company, in the Lehigh Valley, and St. Charles, in

the Lower Susquehanna Valley, blew in.

The condition of the coke furnaces was as follows:

Coke Furnaces, April 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	7	3	3,882	4	2,500
Pennsylvania.....	24	22	35,227	2	2,445
Pittsburgh District.....	2	2	1,924	0	0
Spiegel.....	16	6	6,587	10	8,234
Shenango Val. and Juniata and Conemaugh Valley.....	16	4	3,108	12	9,440
Spiegel.....	1	0	0	1	950
Youghiogheny Valley.....	3	1	1,174	2	1,485
Miscellaneous.....	4	0	0	4	2,500
Maryland.....	5	0	0	5	6,000
West Virginia.....	1	0	0	1	250
Wheeling District.....	8	5	6,059	3	2,092
Ohio.....	14	6	7,819	8	4,205
Mahoning Val. Central and Northern.....	11	6	5,772	5	3,059
Hocking Val. Hanging Rock.....	14	1	774	13	3,041
Indiana.....	2	0	559	12	2,893
Illinois.....	19	5	9,283	14	412
Minnesota.....	1	0	0	1	639
Wisconsin.....	2	2	1,722	3	2,288
Missouri.....	6	0	0	6	3,572
Colorado.....	3	1	1,000	2	1,200
The South:					
Virginia.....	22	7	3,855	15	8,362
Kentucky.....	7	3	1,226	4	1,825
Alabama.....	38	9	9,626	29	15,065
Tennessee.....	14	6	4,642	8	3,020
Georgia.....	2	1	692	1	600
N. Carolina.....	1	0	0	1	97
Totals.....	260	92	105,011	168	103,756

As compared with previous months, the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
April 1, 1894.....	92	105,011
March 1.....	83	89,794
February 1.....	80	81,970
January 1.....	80	81,997
December 1, 1893.....	72	78,241
November 1.....	57	58,820
October 1.....	52	53,061
September 1.....	54	56,976
August 1.....	84	77,907
July 1.....	122	117,072
June 1.....	140	132,079
May 1.....	146	139,788
April 1.....	145	135,488
March 1.....	145	133,579
February 1.....	140	129,396
January 1.....	138	131,731
December 1, 1892.....	136	133,160
November 1.....	133	130,673
October 1.....	128	118,895

On April 1 all the Pittsburgh furnaces with the exception of Soho and one Isabella were active; since then, however, Edith has stopped, two Schoenberger have banked and others may follow on account of scarcity of coke.

In the Shenango Valley, Alice, Spearman and Stewart have gone out of blast, but Claire has since been started. The Cambria Iron Company have ceased making spiegeleisen and ferromanganese. In the Wheeling district, Jefferson and Mingo have started. The Cleveland Rolling Mill Company have blown in a second furnace in March. In the Hanging Rock region, Belfont has stopped.

The principal increase of the month has taken place in the Chicago district, the Illinois Steel Company having blown in three furnaces at the South Chicago new plant and two at the old plant, and having started one Bay View stack at Milwaukee.

In the Mahoning Valley, Mary and Mattie resumed operations in March. The active furnace of the Colorado Fuel & Iron Company at Pueblo has very

considerably increased its product, having averaged just 1000 tons per week in March.

In the South, Virginia records the blowing out of Dora and one Longdale, and the starting of Princess. In Alabama, one of the De Bardeleben furnaces went out. Ensley continues its heavy product, with two furnaces.

On April 1 the position of the charcoal furnaces was as follows:

Charcoal Furnaces, April 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	13	1	60	12	990
New York.....	5	2	214	3	363
Pennsylvania.....	13	2	135	11	761
Maryland.....	6	0	0	6	425
Virginia.....	13	0	0	13	827
Ohio.....	8	1	83	7	520
Kentucky.....	3	0	0	3	290
Tennessee.....	9	1	100	8	991
Georgia.....	3	1	244	2	230
Alabama.....	13	3	727	10	2,390
Michigan.....	20	5	1,963	15	4,555
Missouri.....	2	0	0	2	597
Wisconsin.....	4	1	302	3	1,760
Texas.....	4	1	154	3	470
Washington.....	1	0	0	1	100
Oregon.....	1	0	0	1	200
Totals.....	118	18	3,982	100	15,469

As compared with previous months, the record of active charcoal furnaces stands as follows:

	Furnaces in blast.	Capacity per week.
April 1, 1894.....	18	3,982
March 1.....	18	3,754
February 1.....	18	3,645
January 1.....	21	4,099
December 1, 1893.....	26	4,950
November 1.....	26	5,084
October 1.....	28	5,496
September 1.....	28	5,700
August 1.....	34	5,563
July 1.....	35	7,224
June 1.....	34	8,034
May 1.....	38	8,595
April 1.....	38	8,729
March 1.....	36	8,623
February 1.....	37	8,934
January 1.....	38	8,865
December 1, 1892.....	41	9,509
November 1.....	42	9,540

Chatham, in New York, started on the 6th ult., and Charlotte, at Rochester, an anthracite and coke stack, is soon to blow in on special low phosphorus charcoal iron under the management of C. R. Ellicott. In Ohio both Olive and Pine Grove have blown out. Rome, in Georgia, was idle part of March putting in a new bosh.

Stocks.

The position of stocks, sold and unsold, as reported to us April 1, was as follows, the same furnaces being represented as in former months:

	Jan. 1.	Feb. 1.	Mar. 1.	Apr. 1.
Stocks. Tons.....	145,197	147,132	141,889	141,384
Anthracite pig.....	486,987	501,269	500,217	500,264
Coke pig.....	206,260	203,390	211,945	201,558
Charcoal pig.....				
Totals.....	838,444	851,771	854,051	843,186

It is estimated that the annual production of steel castings is about 30,000 tons annually in the United States. The capacity of the works recently consolidated under the title of the American Steel Casting Company is about 17,500 tons, or more than one-half of that of the whole country.

The Erie road has issued a rate sheet quoting freights from Pittsburgh via Cleveland to Chicago, rail and lake, 11 cents per hundred, and to Detroit 8 cents per hundred, to take effect April 10

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., April 9, 1894.

The Production of Tin Plate.

The special report to the Secretary of the Treasury by Ira Ayer, special agent, Treasury Department, relative to the production of tin and terne plates in the United States during the quarter ended December 31, 1893, with comparative statements of production dated March 22, 1894, has been received, and shows the following results of his investigations:

A total of 39 firms manufactured 27,351,241 pounds of tin and terne plates proper, against an output of 27,145,430 pounds by 35 firms during the previous quarter. Of the output for the quarter, 15,907,669 pounds, more than 58 per cent., was made from sheets rolled in the United States. Of this amount, 15,309,009 pounds, more than 96 per cent., consisted of the class of plates weighing lighter than 63 pounds per 100 square feet. Of the commercial plates made during the quarter, 14,682,045 pounds were coated with tin, and 12,669,196 pounds were terne coated. More than 96 per cent. of all the commercial plates belonged to the lighter class. The quantity of American sheet iron and steel made into articles and wares tinned or terne plated was 1,244,707 pounds. This makes the aggregate output for the quarter from all sources 28,595,948 pounds; previous quarter, 28,198,293 pounds.

The production for the quarter subject to comparison with net imports under the recent ruling of the Department, inclusive of products from American sheet iron and steel, tinned or terne plated, was 16,553,716 pounds, as compared with 9,257,610 pounds during the previous quarter. The total for the two quarters was 25,811,326 pounds.

Three companies, Hughes & Patterson of Philadelphia, Pa.; the New Castle Steel & Tin Plate Company of New Castle, Pa., and the Western Tin Plate Works of Belleville, Ill., made their first sworn returns to the Government. The works at New Castle are complete, both for rolling and coating tin plates, and during the quarter operations were carried on in both branches of manufacture. The number of firms submitting sworn statements of production in excess of previous quarter was four. Besides the Western Tin Plate Works above named the Chicago Stamping Company of Chicago, Ill.; the Meurer Bros. Company of Brooklyn, N. Y., and the Philadelphia Tin Plate Company of Philadelphia were engaged during the quarter in erecting the necessary machinery for coating the plates.

Black Plate Production.—The production of black plate in the United States during the quarter was 19,679,910 pounds, of which 17,197,664 pounds, or nearly 90 per cent., belonged to the class weighing lighter than 63 pounds per 100 square feet. The production of the previous quarter was 11,355,368 pounds, of which 8,147,092 pounds, or about 72 per cent., was of the lighter class. The production of American black plates of the class weighing lighter than 63 pounds per 100 square feet was 2,989,472 pounds in excess of that of any previous quarter since the law became operative. Seventeen rolling mills made sworn returns of production, against 16 for the preceding quarter.

Consumption of American Plates.—Of the 39 firms making sworn returns of the manufacture of commercial tin and terne plates 21 used wholly American plates, with an output of 12,576,443 pounds; 13 used both American and foreign plates, with an output of 10,174,755 pounds, of which 3,831,226 pounds, or about 33 per cent., was made from sheets rolled in the United States; six used wholly foreign plates, with an output of 4,600,043 pounds. Sixteen stamping or other manufacturing companies that use American sheet iron and steel in the manufacture of articles and wares tinned or terne plated submitted sworn statements of production, as against 18 during the previous quarter. The aggregate consumption of American plates in the various forms of manufacture was 17,152,376 pounds, which was equal to about 90 per cent. of the entire production of such plates during the quarter.

The following is a condensed comparative statement of the manufacture of tin and terne plates proper during the fiscal years ended June 30, 1892 and 1893, and the six months ended December 31, 1893:

Period of manufacture.	Amount made from—				
	American black plate.	Per cent. American.	Foreign black plate.	Per cent. foreign.	Total.
Quarter ended September 30, 1891.....	Pounds. 785,547	95.00	Pounds. 41,375	5.00	Pounds. 826,922
December 31, 1891.....	1,200,661	85.16	209,160	14.84	1,409,821
March 31, 1892.....	2,132,082	66.44	1,077,143	33.56	3,209,225
June 30, 1893.....	5,178,163	63.14	3,022,488	36.86	8,200,757
Totals.....	9,296,553	68.12	4,350,166	31.88	13,646,719
From September 30, 1892, to June 30, 1893.....	43,599,724	43.68	56,219,470	56.32	99,818,202
Quarter ended September 30, 1893.....	8,794,027	32.46	18,351,453	67.60	27,145,480
December 31, 1893.....	15,907,669	58.16	11,443,572	41.84	27,357,241
Totals for year 1893.....	54,337,869	.....	69,268,318	.....	123,606,707

The amount of American sheet iron and steel made into articles and wares tinned or terne plated during the same period was as follows:

	Pounds.
From July 1, 1891, to June 30, 1892, total.....	5,620,867
From July 1, 1892, to June 30, 1893, total.....	8,802,681
Quarter ended September 30, 1893.....	1,052,813
Quarter ended December 31, 1893.....	1,244,707
Total calendar year 1893.....	7,350,306

The amount of American black plates used in the aggregate manufactures during the period from July 1, 1891, to December 31, 1893, was:

	Pounds.
Quarter ended—	
September 30, 1891.....	1,914,764
December 31, 1891.....	2,599,981
March 31, 1892.....	3,620,343
June 30, 1892.....	6,822,322
September 30, 1892.....	7,197,014
December 31, 1892.....	10,516,412
March 31, 1893.....	14,102,299
June 30, 1893.....	20,536,680
September 30, 1893.....	9,846,840
December 31, 1893.....	17,152,376

A very instructive statement has been compiled, showing the rapid development of the production of sheet steel or black plates. The table below proves how rapidly American manufacture increased the output of plates lighter than 63 pounds per 100 square feet. It will be noted that while in the earlier periods the heavier plate represented by far the larger percentage, the quantity of light plates rose to its maximum, even during the panic period of the fourth quarter of last year.

Statement by Quarters of Fine Sheet Steel, or Black Plates, Produced in the United States from July 1, 1891, to December 31, 1893.

Periods.	Lighter than 63 pounds per 100 sq. feet.	63 pounds per 100 sq. feet and heavier.	Total.
Quarter ending—	Pounds.	Pounds.	Pounds.
Sept. 30, 1891.....	4,910,107	3,618,006	8,528,113
Dec. 31, 1891.....	679,584	4,593,416	5,273,000
March 31, 1892.....	1,696,595	4,979,370	6,675,965
June 30, 1892.....	4,761,611	5,087,537	10,289,178
Totals.....	7,626,927	18,586,329	26,213,256
Quarter ending—	Pounds.	Pounds.	Pounds.
Sept. 30, 1892.....	4,821,180	4,202,277	9,023,457
Dec. 31, 1892.....	5,575,541	5,444,675	11,020,216
March 31, 1893.....	13,287,507	6,361,848	19,649,355
June 30, 1893.....	14,208,192	6,780,321	20,988,513
Totals.....	40,892,420	22,789,121	63,681,541
Quarter ending—	Pounds.	Pounds.	Pounds.
Sept. 30, 1893.....	8,147,092	3,208,276	11,355,368
Dec. 31, 1893.....	17,197,664	2,482,246	19,679,910
Totals.....	25,344,756	5,690,522	31,035,278

Imports and Exports.—The quantity of tin plates and terne plates imported and entered for immediate consumption and of such as were imported on and after July 1, 1891, and were withdrawn from warehouse for consumption during the quarter ended December 31, 1893, was:

Imports.	Lighter than 63 pounds per 100 sq. ft.	63 pounds per 100 sq. ft. and heavier.	Total.
	Pounds.	Pounds.	Pounds.
Tin plates.....	72,612,906	1,337,023	73,949,929
Terne plates.....	9,775,513	120,941	9,896,454
Totals.....	82,388,419	1,457,964	83,846,383

The quantity of tin plates and terne plates on which duties were paid and which were used in the manufacture of articles exported with benefit of drawback during the quarter was:

Exports.	Lighter than 63 pounds per 100 sq. ft.	63 pounds per 100 sq. ft. and heavier.	Total.
	Pounds.	Pounds.	Pounds.
Tin plates.....	32,663,671	86,540	32,750,211
Terne plates.....	4,423	.....	4,423
Totals.....	32,668,094	86,540	32,754,634

PERSONAL.

A committee of the Franklin Institute, consisting of Joseph M. Wilson, W. A. Wahl and H. R. Heyl, has awarded to Jarvis B. Edson a John Scott legacy premium for his well-known pressure recording gauge.

A. J. Moxham of the Johnson Company will speak to the toast of "Greater Cleveland" at the forthcoming banquet of the Chamber of Commerce of that city.

A. von Drebber, who was one of Krupp's representatives during the World's Fair, has just returned to Europe, the last of the Krupp exhibit having been shipped.

It is reported that the health of Andrew Carnegie has not been good lately.

W. J. Taylor of High Bridge, N. J., has sailed for California via the Isthmus for his health. He will be absent three or four months.

S. A. Gourley, for some years manager of the plant of P. H. Laufman & Co., sheet manufacturers, at Apollo, Pa., has resigned his position. Mr. Gourley has identified himself with a new enterprise which contemplates the erection of a plant at Saltsburg, Pa., for the manufacture of iron and steel sheets.

Chief Engineer F. A. Wilson, United States Navy, has been detached from the New York Navy Yard and ordered to duty at the Union Iron Works as inspector of machinery of the "Olympia" and "Oregon." Mr. Wilson succeeds Chief Engineer J. W. Moore, who is about to retire from the naval service.

Passed Assistant Engineer J. P. Mickley of the Navy goes to the Standard Steel Works, Thurlow, Pa., as inspector of steel.

A number of changes have recently been made among superintendents in some of the departments of the Homestead Steel Works, Homestead, Pa. Leo Bullion, for some years superintendent of the 119 inch mill, has sent in his resignation and has been succeeded by J. R. Hunt, who has for some time been superintendent of the 32-inch mill. The report that C. M. Schwab had resigned his position as general superintendent of the Homestead Steel Works and had been succeeded by P. R. Dillon has been officially denied. It is stated, however, that Millard Hunsiker, whose title is Chief of Engineers, has now entire charge of the armor plate department.

The opening of the Chilean National Mining and Metallurgical Exposition, which was to occur at Santiago during the current month, has been postponed by decree of the Supreme Government until September next. The postponement has been decided upon in order to give opportunity for more thorough preparation by the Government, and because it was thought impracticable for exhibitors to prepare and forward their exhibits in the short time allowed. The exhibition will be divided into the following sections: Motive power, electricity, mining machinery, mechanical preparation of minerals, metallurgy, chemical industries, statistics and plans, and mining and metallurgical products. The Government will convey gratis to the exhibition all articles comprised in the above classifications which it may be desired to exhibit. The Government

will also pay the passage money by sea and land of the workmen and operatives whom exhibitors may desire to send for the purpose of setting up and running the machinery and apparatus they exhibit. Application for space should be made to the Chilean Legation at Washington, D. C.

The World's Fair Buildings.—The Chicago dealers in old material are very greatly disgusted with the unbusiness-like methods of the South Park Commissioners, who are now endeavoring to dispose of the World's Fair buildings. The withdrawal of these buildings from sale after having invited sealed bids and accepted certified checks from the bidders for the faithful performance of their contracts was a questionable proceeding to start with. But since then the efforts to sell the buildings at private sale have not been in strict accordance with methods practiced by reputable business houses. Offers have been received from various parties for separate buildings and for the buildings as a whole, which have been used by the representative of the commissioners to induce other parties to advance their bids. Intending purchasers have thus been compelled to dance attendance almost daily for the past two or three weeks by the indefinite character of the negotiations and representations that another advance of a moderate character would probably secure the building or buildings. The bids have in this way been worked up to about \$75,500 for all the buildings, at which price they were sold to L. C. Garrett of St. Louis.

The Pittsburgh Wire Company of Pittsburgh, with works at Braddock, Pa., turned out more wire rods and plain wire during the month of March, just closed, than ever before in any one month in the history of the concern. Their entire product of wire and wire rods is sold up for some time to come. This concern are just completing the erection of a number of wire nail machines, which they expect to put in operation at an early date. However, the Pittsburgh Wire Company will not be sellers of wire nails in the open market, their entire product being consumed by the Bindley Hardware Company, which concern are selling agents for the Pittsburgh Wire Company.

The quarterly report of the United States Iron & Tin Plate Mfg. Company, Demmler, Pa., to the Special Agent of the United States Treasury Department shows that during the quarter ending March 31, 1894, the output of the above concern was as follows: 2,020,757 pounds of tinned plates and 1,186,360 pounds of black plates for tinning, or a total of 3,207,117 pounds. Of this, 2,867,648 pounds were lighter than 63 pounds and 339,469 pounds over 63 pounds per 100 square feet.

At Pittsburgh, last week, bids were opened by the Department of Public Works for the supplying of a large amount of water pipe. Bids were received from the National Foundry & Pipe Works, Limited, Scottdale, Pa., the Addyston Pipe Company, Covington, Ky., and the McNeil Pipe & Foundry Company of Burlington, N. J. The contract was let to the Addyston Pipe Company, Covington, Ky., the bid of that concern being \$17.70 per ton. This is the lowest price ever made for furnishing of water pipe to

the above city, as last year \$21.40 per ton was paid, while ten years ago the price was \$85 per ton.

Chicago Builders and Walking Delegates.

The builders and contractors of Chicago have planned a grand *coup* for the discomfiture of the walking delegates who have been giving them so much trouble this spring. It is the cessation of all building operations throughout the city on the 11th inst., to continue until an agreement can be made by the employers and their workmen which will enable work to be prosecuted without the vexatious interference of the walking delegates, who are constantly fomenting trouble in order to magnify their own importance. There is no question of wages involved in this movement, although in some lines there are such disputes pending. These troubles, however, are to be settled by those interests which are directly concerned. The builders, contractors and materialmen have formed an organization styled the Central Building League to carry out their purposes. The action was taken at this time to forestall strikes threatened in several trades which promised to seriously interfere with building operations now becoming unusually heavy. It is deplorable that action of this kind should seem necessary just as workmen are finding employment in large numbers after a most trying winter of scanty work and great privations. The conflict, however, has been brought about by the workmen themselves. It is hoped that a speedy settlement may be made, so that the interruption to work will not be serious. If it should be prolonged it will be a severe shock to business, as so many interests are affected apart from those directly engaged in the unfortunate controversy.

Southern Freight Rates.—The new freight rates on pig iron from Birmingham, Ala., via the Queen & Crescent Route and the Louisville & Nashville Railroad, are given below to a few of the more important points where a difference in tariff on the two lines exists:

From Birmingham to—	Via Q. & C.	Via L. & N.
Anderson, Ind.....	\$2 75	\$2.85
Buffalo, N. Y.....	3.50	3.70
Cleveland, Ohio.....	3.00	3.25
Columbus, Ohio.....	2.70	2.90
Dayton, Ohio.....	2.50	2.70
Detroit, Mich.....	3.00	3.30
Indianapolis, Ind.....	2.75	2.85
Pittsburgh district.....	3.50	3.70
Springfield, Ohio.....	2.70	2.80
Toledo, Ohio.....	3.00	3.10

The programme for the annual convention of the Amalgamated Association of Iron & Steel Workers, to be held in Cleveland, Ohio, commencing on May 15, will be issued in a few days. This will be the first convention of the above organization ever held outside of Pittsburgh. The general tenor of the propositions made by the different lodges is that at the first improvement in general business there will be a demand for higher wages.

The court has decided in favor of Naylor & Co. of New York in the dispatch suits growing out of iron ore sales to the Bethlehem Iron Company and the Pennsylvania Steel Company.

MANUFACTURING.

Iron and Steel.

The Fowler Foundry Company, 1323 Monadnock Block, Chicago, are using a Roberts-Bessemer converter in making steel castings at their works, near South Chicago. Their experience with the metal turned out by this process has been gratifying. In making railroad castings, their percentage of imperfect pieces has been so low that it would have been deemed very creditable even for iron molding. They have also been successful in making intricate small castings for electrical purposes. The company believe that they are now alone in the use of the Roberts converter, having reports that all others erected in this country are now in disuse.

The citizens of Tacoma, Wash., have raised the subsidy of \$35,000 required to secure the location near that city of the Burlington Rolling Mill, now at Burlington, Iowa.

The King & Andrews Company, 218 North Union street, Chicago, who control all rights to the McDowell semi-steel process for making castings, have just licensed the Niles Tool Works of Hamilton, Ohio, and the Farrell Tool & Machine Company of Ansonia, Conn., to use these processes in their works.

Among recently authorized corporations in Illinois is the American Steel Foundry Company, Granite City, Madison County. Capital stock, \$300,000. Incorporators: Edward F. Gottra, James G. McRoberts and Valle Reyburn.

At St. Louis, Mo., the E. E. Souther Iron Company have been incorporated, with a capital of \$60,000, all paid. Eustace E. Souther owns 597 shares, and Albert G. Souther, Wm. M. Scudder and Frank E. Coddington one share each. The Great Western Wire Company also filed articles of incorporation, with paid-up capital stock of \$25,000. The incorporators are: Wm. Herzog, 189 shares; Albert Thiele, 40 shares; August Becker, 10 shares.

Potts Brothers Iron Company, Limited, have started up their works at Pottstown, Pa., on orders recently secured. The puddlers went to work at the rate of \$2.25 per ton.

The Akron Iron Company of Akron, Ohio, have reduced wages in their shafting department 10 per cent.

The Atha & Illingworth New Jersey Steel Works, at Harrison, N. J., have reduced wages from 7 to 10 per cent.

Pine Grove Furnace, operated by Means, Kyle & Co., at Hanging Rock, Ohio, has blown out.

The American Tube & Iron Company of Middletown, Pa., are operating their works between 50 and 70 per cent. of their capacity. While prices are very low and inquiries have not shown any marked improvements during the past two months, the company hope for better business with the settled weather.

Dora Furnace of Pulaski, Va., after one of the most successful blasts of any furnace in the South, blew out on March 29. The Dora was blown in on May 23, 1892, by James Duane, who has superintended the furnace during its blast, when the following records were made: Best day's output, 238 tons; best week's output, 1498 tons; best month's output, 5477 tons; total iron made in 22 months, 95,000 tons. This record is stated to overreach the output of any furnace of like size in the South.

The furnace of the Claire Furnace Company, Limited, at Sharpsville, Pa., resumes blast during the coming week. It has been idle since August, 1893.

The 300 employees of the Hamilton Rolling Mills, at Hamilton, Ont., who struck last week against a reduced scale of wages, have returned to work. Concessions were made on both sides.

Every department of the works of the Pennsylvania Steel Company, Steelton, Pa., was in operation last week, a portion of the plant working night as well as day. A large increase was made in the force, which now numbers 3:00.

The puddlers at the Slatington Rolling Mill, Slatington, Pa., have been reduced to \$2.70 a ton.

Blast furnace No. 6 of the Bethlehem Iron Company, Bethlehem, Pa., is being fired up, preparatory to resuming operations. Two stacks are already in blast.

The partnership heretofore existing between Geo. W. McClure, Carl Amsler and S. V. D. Huntington, doing business under the firm name and style of McClure, Amsler & Co., engineers and contractors, at Pittsburgh, and sole agents in this country for the erection of Massick & Crookes patent fire brick stoves, was dissolved on the 2d inst. by mutual consent, S. V. D. Huntington retiring from said firm. The business will be continued at the old location by Geo. W. McClure and Carl Amsler under the firm name and style of McClure & Amsler. The new firm of McClure & Amsler have just closed a contract with Shoenberger, Speer & Co., proprietors of the Juniata Furnaces, at Pittsburgh, for the erection of an auxiliary Massick & Crookes hot blast stove 18 x 65 feet in size.

Announcement is made that the Warren plant of the Union Iron & Steel Company, at Warren, Ohio, which has been idle for some time, will not resume operations until there is a material improvement in the iron business.

The Pittsburgh Iron & Steel Engineering Company of Pittsburgh, engineers and contractors for the erection of iron and steel plants, have opened an office in New York City under the management of W. C. Caffin.

Hubbard Furnace of Andrews & Hitchcock, at Hubbard, Ohio, was blown out last week for an indefinite period.

The Crescent Steel Company of Pittsburgh have commenced work on the erection of a new building to be 60 x 100 feet in size.

The new foundry recently erected at the Edgar Thomson Steel Works, Bessemer, Pa., has been put in partial operation.

Machinery.

The Bristol Company of Waterbury, Conn., manufacturers of recording gauges and steel-belt lacing, have purchased property in the vicinity of Waterbury, and will during the summer erect a large factory to accommodate their rapidly growing business.

The Gartland Foundry Company of Cleveland, Ohio, started their works last October, when everything in the iron business looked very blue. They were fortunate in procuring some large contracts, which they executed with such dispatch that they have been running steady since, with orders enough booked to keep busy until fall. They manufacture gray iron castings, their specialty being light work.

Warren Webster & Co. of Camden, N. J., manufacturers of vacuum feed water heaters and purifiers and oil and steam separators, report that the number of orders they received for their specialties during the month of March was very satisfactory, and showed a marked improvement over former months. They infer that the demand is owing to the saving in fuel incident to the use of their goods. Rapid progress is being made upon the new extension to their wrought iron department.

Ebi & Neuman, founders and machinists, Davenport, Iowa, report that while business has not justified an increase in size or equipment of plant, they have made some valuable improvements in their feed mills and also in their boiler fronts.

The Minnesota Smokeless Furnace Company of Minneapolis have filed articles of incorporation. The object of the concern is the manufacture of the Nonpareil smoke preventing device, and the capital stock \$25,000.

At the Union Iron Works, San Francisco, Cal., wages have been reduced 12½ per cent.

At Hannibal, Mo., enough stock has been subscribed to insure the establishment of a plant for the manufacture of steam engines. It is proposed to raise \$25,000 for the purpose.

An explosion recently occurred at the Ramapo Iron Works, Ramapo, N. Y., the south end of the iron works being considerably damaged and a portion of the machinery injured.

The Buckeye Engine Company have removed their office from 18 Cortlandt street to more commodious quarters at 39 and 41 Cortlandt street, New York. The company call particular attention to their new vertical compound engines for electric light and railway service, ranging from 150 to 1200 horse-power and over. This engine is specially adapted for direct connecting to dynamos.

The Walburn-Swenson Company of Chicago, Ill., engineers and iron founders, and

who are largely engaged in the manufacture of special machinery for the making of sugar, and also for the concentration of ores, report that their business has been greatly curtailed by the uncertainty of legislation. They have evidence on every hand that new improvements requiring their machinery are simply awaiting developments at Washington.

The F. S. Hutchinson Company of New York have been incorporated at Albany, with a capital of \$20,000, to manufacture hoisting apparatus and building appliances.

Thomas Carlin's Sons, Allegheny, Pa., have received a contract from the Ohio Steel Company, Youngstown, Ohio, for two of Carlin's patent iron grinding and mixing pans. The same firm are also in receipt of orders for haulage machinery to be furnished to the Oliver Coke & Furnace Company, Uniontown, Pa., and have received a contract from the Franz Brick Company, Wittmar, Pa., for a large hoisting engine. The latter firm have two of Carlin's patent grinding pans at work on the hardest kind of shale rock, for the manufacture of red brick, and they are working with excellent results.

The works of H. K. Porter & Co., at Pittsburgh, builders of light locomotives, have gone on increased time, due to the receipt of a large number of orders.

Hardware.

The Mallory-Wheeler Company, New Haven, Conn., began on the 9th inst. to run six days a week, nine hours a day. The wages of all employees have been reduced 10 per cent. The works have heretofore been running eight hours a day, five days a week.

Connecticut Valley Mfg. Company, Centerbrook, Conn., whose plant was destroyed by fire some time since, expect to have their new brick factory ready for occupancy in August next.

The Eastern Tinware Company, Portland, Conn., are running their factory ten hours a day.

The Cream City Woven Wire Works of Milwaukee, Wis., have received authority to increase their capital from \$50,000 to \$60,000.

About 3000 men are now employed by Washburn & Moen Mfg. Company at their Worcester works. Each week sees an increase in the number and size of orders received.

The Millersburg Hedge & Wire Fence Company, Millersburg, Ohio, were organized recently with the following officers: S. E. Mayers, president; Alfred Peter, vice president; C. W. Stuber, secretary and treasurer.

The Kenyon Bicycle Company, situated at Eighth and Locust streets, Des Moines, Iowa, have filed amended articles of incorporation with the County Recorder, changing the name of the company to the Pacemaker Bicycle Company. The stockholders have increased the capital stock from \$25,000 to \$100,000. The officers are: President, George R. Lathrop; secretary, C. C. Rhodes, and treasurer, A. B. Edmonds.

The Diamond Clamp & Flask Works, Richmond, Ind., report the receipt, among others, of a good sized order for dowel pins from Switzerland. The productions of the concern are meeting with very flattering reception wherever introduced.

At a recent meeting of the Board of Directors of the Shelby Steel Tube Company, Shelby, Ohio, B. J. Williams, who has been secretary and treasurer of the company from their inception to the present time, tendered his resignation, the banking business with which he has long been associated demanding more of his time. J. C. Pattison has been elected his successor. The business of the company continues to grow, the past month showing a shipment of nearly 350,000 feet.

The Patton Mfg. Company have made arrangements to remove their plants to Muncie, Ind., where the following structures will be erected: Enameling and machinery department, 400 x 60 feet, partly two stories; foundry, 400 x 120 feet, with a wing, 109 x 150 feet; warehouse and packing department, 400 x 60 feet, two stories high. The Columbus works will be transferred as soon as the new plant is completed, but the contract with the State will defer the removal of the Jeffersonville plant for three years.

The Commissioners of Canadian County, Oklahoma Territory, have recently pur-

chased steel cells for the jail at El Reno, the county seat. The cells are 7 feet square and 7 feet high, with exercise corridor in front 6 feet wide. The cell doors are provided with a lever locking device, so arranged that the jailer can secure them from the outside without entering the corridor or coming in contact with the prisoners. The material used in the construction of these cells is described as five-ply genuine chrome steel, which consists of three layers of iron alternated with two layers of hard crucible cast steel, all welded firmly together. This work was furnished by E. T. Barnum of Detroit, Mich.

Miscellaneous.

Webb Williams, the inventor of a new sleeping car, is negotiating with St. Joseph, Mo., parties with a view to locating works in that city.

There is a probability that the car shops of the Pullman Palace Car Company, located at Wilmington, Del., may be removed to Philadelphia. The officers of the company state that such a change has been considered, but will not take place at present.

The Heath Rail Joint Company, now located at West Superior, Wis., have closed a contract with the Chicago Heights Land Association for a large plant at Chicago Heights, and will there carry on the manufacture of the Heath rail-joint, which combines bed plate, angle bar, rail brace and support between ties in one piece. Henry Hill of Hill, Sons & Co., bankers, in Minneapolis, is the moving spirit in the company, and states that the company will construct at Chicago Heights one of the most modern plants in existence not only for the manufacture of rail joints but will there carry on the manufacture of various devices used in the construction and equipment of railway cars and engines. The company's factory will be located between the Michigan Central Railway, the Chicago and Eastern Illinois Railway and the Elgin, Joliet and Eastern Railway.

Last week N. P. Hyndman, Conestoga Building, Pittsburgh, Pa., Western sales agent for the Hazard Mfg. Company, wire rope manufacturers, Wilkesbarre, Pa., closed a contract with the Citizens' Traction Company of Pittsburgh for a wire cable 28,700 feet long and 1 5-16 inches in diameter. This cable will be used in the East Liberty loop of the Citizens' Traction Railway. Also a cable 6100 feet long and 1 5-16 inches in diameter to be furnished to the Central Traction Company of Pittsburgh, and to be used in the down town end of that line. Also a cable 1780 feet long and 2 inches in diameter for No. 1 plane of the Pittsburgh & Castle Shannon Incline Plane Company. The material entering into these cables all comes from abroad, and is known as English tempered steel, being especially adapted for use in the manufacture of cables, and is imported into this country in the shape of wire rods.

The Keystone Bridge Works of Pittsburgh have received contracts for a large amount of work for the Westinghouse Air Brake Company, at Wilmerding, Pa. Commencing on Monday, the 9th inst., the plant of the Keystone Bridge Works will be operated on increased time.

The plant of the National Switch & Signal Company, at Odenweldtown, Pa., has been sold at public auction to Oakley Thorn of New York, president of the old company, for \$40,000. The company will be reorganized and the works operated on a larger scale than heretofore.

Frank D. Moffat & Co., iron, steel and coke merchants, who also have an engineering department devoted more especially to the supplying of sugar machinery for export, will move about May 1 to larger offices in the new building corner of Beekman and Gold streets, New York. Moffat & Co. are large shippers of machinery to Cuba and are licensees and builders of the Lillie evaporating apparatus for the West Indies.

Advices from Providence, R. I., report that the large yacht building establishment of the Herreshoffs, at Bristol, has been closed down for an indefinite time. Very few fast yachts will, it is thought, be put on the stocks this season.

The Iron and Metal Trades.

The renewal of troubles in the Connellsville coke region was a contingency which many in the trade have kept in view.

There have been pretty heavy sales of Bessemer Pig in Pittsburgh and the valleys at low prices. Some large blocks were taken on conversion contracts, and one large Steel works in Central Pennsylvania has bought 10,000 tons in the valley at a price reported to make it cost \$11.25 delivered. It is stated, too, that blocks of Cornwall Pig for mixing have been taken at a very low figure.

In the Foundry Iron trade Philadelphia reports a good deal of activity, buyers having taken hold at the temptingly low offers made. Along the seaboard and in New England the unsettled condition of freights in Southern Iron leaves the situation in a mixed condition. It is pretty plainly intimated that very low rates are to rule and that prices of Pig Iron will be correspondingly cut. In the West buyers are hesitating about placing orders for Southern Iron, the feeling evidently prevailing that the recent concessions in freight rates have not yet reached the bottom.

Pittsburgh notes, in connection with Bessemer Pig, the purchase of a round block for speculation. Besides this, it is known that one large concern has bought a considerable quantity for a long pull.

Careful observers, while acknowledging that no early rise of any consequence is likely, do express the opinion that purchases at present prices are safe.

The Eastern Pennsylvania mills have been picking up quite a considerable amount of work lately, of course at very low prices. But their costs are low, since they can buy gray forge close to \$9.75 at furnace, and are puddling at a cheap rate. They have taken quite a number of moderate sized orders for Sheared Skelp, Iron Plates, &c. Prices continue extremely low. Thus 90¢ has unquestionably been done in the West on Iron Bars.

Quite a fair amount of structural work has come up in New York and Eastern points lately, and in the West some bridge orders are being placed. On roofs and sheds record breaking prices have been made, reports being in circulation that 2¢ erected has been accepted.

There has been an easing tendency in Wire Rods, which, it is reported, can be purchased for forward delivery at \$24, Western mill.

In the Metal markets the only features of interest are a sharp advance in Pig Lead and a somewhat demoralized condition of affairs in Spelter.

Chicago.

(By Telegraph.)

Office of The Iron Age, 59 Dearborn street, CHICAGO, April 11, 1894.

The volume of business is again decreasing. The tendency to improvement so noticeable during the last month or more has been lost to a great extent. This is, perhaps, more noticeable in business circles in Chicago and its immediate vicinity than in the district tributary to the city. The labor troubles in the building trade have a depressing effect. The weather is also interfering with outdoor operations.

Pig Iron.—Transactions for the week have not been up to the average for the preceding four or five weeks. Local furnaces have taken the greater part of the business, such as it was. Southern sellers have done somewhat better in the country districts than in the city, but their sales have seldom exceeded 100-ton lots. The influence of the heavy reduction in freight rates from the South is felt unfavorably. Although the price of Northern as well as Southern Iron is now much lower than anything before known in this locality, yet buyers appear to have no confidence that values have actually touched bottom. They are disposed to wait for further developments and are apprehensive of changes in freight rates in other directions. Transactions are therefore confined to actual requirements in all kinds of Iron. Southern railroad representatives manifest considerable disappointment over the result of the recent reduction, having confidently expected it to prove a decided stimulus to trade with their section. Quotations are given as follows for cash:

Lake Superior Charcoal.....	\$15.00 @	\$15.50
Local Coke Foundry, No. 1....	11.25 @	11.50
Local Coke Foundry, No. 2....	10.50 @	11.00
Local Coke Foundry, No. 3....	10.00 @	10.50
Local Scotch.....	11.50 @	11.75
Ohio Strong Softeners No. 1....	13.00 @	14.00
Southern Silvery, No. 1.....	..... @	11.50
Southern Silvery, No. 2.....	..... @	11.00
Southern Coke, No. 2.....	10.00 @	10.35
Southern Coke, No. 3.....	9.75 @	10.00
Southern, No. 1, Soft.....	10.25 @	10.50
Southern, No. 2, Soft.....	9.75 @	10.00
Tennessee Charcoal, No. 1....	15.00 @	15.50
Tennessee Charcoal, No. 2....	14.50 @	15.00
Alabama Car Wheel.....	17.85 @	18.00
Jackson County Silvery.....	15.00 @	15.50
Other Ohio Silvery.....	13.00 @	13.50
Coke Bessemer.....	12.00 @	.....

Bars.—Manufacturers report a light trade, inquiries being for small lots only. These are fairly numerous, but the aggregate is not large. Bar Iron appears to have touched hard pan, as no further concessions are now rumored. Buyers who a month ago asserted their intention to defer purchases until the base price touched 1¢, Chicago, have not yet been able to accomplish their purpose. Prices continue to range from 1.05¢ to 1.15¢, Chicago. Soft Steel Bars are no more active than Bar Iron, but consumers having season contracts continue to change from Iron to Steel in the exercise of options previously given them. Mill shipments of Soft Steel Bars are quoted at 1.15¢ @ 1.25¢, Chicago. Jobbers report a falling off in their trade, and quote small lots from stock at 1.30¢ @ 1.40¢.

Structural Material.—Some small orders for bridge work have been given out during the past week. The local demand for Beams and other Building Shapes is decidedly checked on account of the troubles in the building trades, but a good business in small lots is reported with outlying sections, which are free from the disturbing influences now affecting city trade. Quotations on mill shipments are as follows for Chicago de-

livery: Beams and Channels, 1.35¢ @ 1.40¢; Tees, 1.50¢ @ 1.60¢; Angles, 1.35¢ @ 1.40¢; Universal Plates, 1.30¢ @ 1.35¢. Small lots from stock are sold at an advance of 10¢ @ 15¢ per 100 lb above these prices.

Plates.—Dealers report a moderately good demand from stock and state that their customers are figuring on so many new jobs that the prospects are excellent for an increase in the movement. Manufacturers' agents have had a dull week. Mill shipments, Chicago delivery, may be quoted as follows: Tank Steel, 1.35¢ @ 1.45¢; Flange Steel, 1.60¢ @ 2.10¢; Fire Box, 2¢ @ 2.05¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 1.80¢ @ 1.90¢; Tank Steel, 1.60¢ @ 1.85¢; Flange Steel, 2.10¢ @ 2.35¢; Boiler Tubes, 75 % off.

Sheets.—A continued stream of inquiries is reported from large buyers for summer and fall delivery. The mills are now more generally quoting for delivery through the summer months. Galvanized Iron is not so active as it has been, which is ascribed to the trouble in the building trades. Quotations on mill shipments, Chicago delivery, are as follows: No. 27 Common Sheets, 2.25¢ @ 2.35¢; No. 27 Soft Steel Sheets, 2.35¢ @ 2.40¢; Galvanized Iron, 75 and 10 and 5 % off; Sheet Copper, 14¢ base, with no discount.

Merchant Steel.—No new developments have occurred in this line. We quote mill shipments, Chicago delivery: Smooth Finished Machinery and Tire, 1.70¢ @ 1.80¢; Open Hearth Spring Steel, 1.85¢ @ 1.90¢; Bessemer Machinery, 1.55¢ @ 1.60¢; Bessemer Tire, 1.40¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

Billets and Rods.—Good inquiries have been received for Billets, but local manufacturers are not in position to entertain them, being unable to make deliveries in the time specified. They are well sold up to July, but consumers are not yet asking for deliveries beyond that time. Nevertheless the present condition of trade in Billets is so good that no weakening in prices is looked for, but on the contrary, an advance would not be surprising. Quotations continue at \$17 @ \$17.25. The condition of the Wire Rod mills is unchanged, their product being sold up to July. Nominal quotations are held at \$26 50.

Rails and Track Supplies.—Very little new business has been entered for Standard Rails since our last report, but inquiries received are for good sized quantities and a number of transactions are expected to be closed at an early date. A feature of the Rail trade which is now prominent is the increasing inquiry for Light and Girder Rails for projected electric lines. If these projects materialize to any considerable extent, there will be a heavy tonnage taken by this branch of the railroad interest. Quotations continue at \$25 @ \$27 for standard sections of Steel Rails; 1.40¢ for Splice Bars; 2.30¢ @ 2.40¢ for Track Bolts with Hexagon Nuts, and 1.70¢ @ 1.80¢ for Spikes.

Old Rails and Wheels.—The offers of Old Iron Rails by Western railroads have not yet led to transactions. Consumers are holding back, as their business does not warrant the purchase of any considerable quantity unless Rails can be had at an extremely low price. Nominal quotations are continued at \$10 @ \$10.50. Old Steel Rails are also quiet with quotations ranging from \$7 to \$8 for mixed lots. Old Car

Wheels are quoted at lower prices, nominally \$10 @ \$10.50.

Scrap.—About the only business being done is in Cast Scrap, which is in fair demand from dealers' hands. Railroad companies are endeavoring to dispose of their accumulations, but find consumers unwilling to purchase except at very low prices. Dealers quote the following selling prices per net ton: No. 1 Forge, \$9 @ \$9.50; No. 1 Mill, \$6.50; Pipes and Flues, \$6; Heavy Cast, \$7.50; Stove Plate, \$5 @ \$5.50; Fish Plates, \$12; Horseshoes, \$9; Mixed Steel, gross ton, \$5.

Metals.—Carload lots of Lake Copper are a little weaker and are now quoted at 10¢, but Casting Copper is unchanged 9¢. Spelter is weaker and is offered at 3.55¢ without leading to business. Good sized lots of Pig Lead have been sold during the past week at 3.30¢, at which the market is now firm. Largest consumers are holding off in the hope that prices may decline, but dealers report no success in the supply.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., April 10, 1894.

Signs of improvement are beginning to present themselves, and it is safe to say that the past week's business has been larger than during many weeks preceding. The demand has been of a well distributed character, and has given a nice little lift in some quarters. Prices have been at the very lowest, and indeed could not have been otherwise, but the primary object is to get to work, and that appears to have been more fully accomplished than at any time since the first of the year. The orders taken are not in very large lots individually, but several mills that were running on day to day orders are now full for three or four weeks—some five or six weeks, while a few are still doing little or nothing. The average, however, shows gratifying improvement, and from the number of inquiries on the market it is believed that present conditions will be maintained, even if there is no further improvement. There has also been some good buying of Pig Iron, and anything that was made available at the right kind of price has been promptly taken in large quantities.

Pig Iron.—The volume of business has been considerably larger during the past few days, and while prices are lower holders feel very much encouraged by the liberal acceptances from leading consumers. Naturally the figures were very low, but the satisfactory feature is that there is a demand at a price. Hitherto it has hardly been worth while to attempt to sell large lots, hence transactions have been confined to such quantities as buyers were willing to accept. Recently bids have been made and accepted for 500, 1000 and 3000 ton lots, with requests for options on additional quantities, all of which confirms the impression that business is improving. Besides this, other negotiations are fairly under way which promise to clean up all the odds and ends, or anything that is offered at attractive prices. Some holders complain that they have not been able to do anything, and intimate that the railways have dropped their rates of freight, particularly in the direction of Virginia, and thereby given that group of furnaces a chance to compete with those in Western Pennsylvania. Liberal sales have been made by Schuylkill Valley furnaces, however, so that while

it is not unlikely that reduced freights have helped to bring some Irons into the market it is not all due to that, as New England orders have been placed here much more freely than seemed probable a week or two ago. What a few days more may bring forth is hard to say, but the feeling is much better, and is probably warranted by the facts above mentioned. Prices have been extremely low, lower than our inside quotations, but to get things moving holders were not inclined to stick at 25¢ a ton when the quantity was large enough to make it an object. There is an impression that very heavy cuts in freights are pending, and that, in fact, some of the sales just closed could not have been possible unless special arrangements of this kind had been made to enable the sellers to get out whole. What the exact figures are it is impossible to say, but they are understood to be much lower than ordinary quotations. Among the sales noted is one of 10,000 tons Bessemer from the West at a figure supposed to be at very little over \$11.25, delivered in consumers' yards. General quotations for Philadelphia deliveries are about as follows, and from 25¢ to 40¢ less at interior points, such as Harrisburg and vicinity:

Western Bessemer.....	\$11.75 @ \$12.00
Standard No. 1 Foundry X.....	12.50 @ \$13.00
Standard No. 2 Foundry X.....	11.75 @ 12.25
No. 2 Plain.....	10.75 @ 11.00
No. 1 Soft.....	11.00 @ 11.50
No. 2 Soft.....	10.50 @ 10.75
Standard Gray Forge.....	10.75 @ 11.00
Ordinary.....	10.00 @ 10.50

Steel Billets.—Business has been exceedingly quiet during the past week, and even now there is no great inquiry. Western mills appear to be pretty well supplied with orders and are, therefore, not crowding this end of the market, although orders could be placed at \$17.25, delivered—perhaps less if the right kind of an offer was made. Some mills quote higher figures, but buyers are not alarmed, because if one asks more money others are quite ready to do business at the old quotations.

Finished Material.—The feeling in this department is gradually improving, based on a more general demand, but without any decided change in prices. In nearly all departments there is increased activity, and as the demand is of a more general character than usual, it leads to the impression that the market is broadening and gradually assuming its normal condition. It should be understood, however, that there is still a large amount of idle capacity and that the orders do not extend very far ahead, although there are very few mills that cannot see their way to three or four weeks' full work, which is infinitely better than they have been doing for a long time past. Some mills have work under contract that will employ them for months—bridge works especially—but the satisfactory feature is in the better distribution of orders among the smaller mills, indicating a wider range of work in branches which until recently have lain dormant. Besides this there is an encouraging amount of structural work in prospect, so that on the whole the situation is clearly better than it has been at any time since the first of the year. Prices, however, are at the lowest, and while the tendency is to try for a small advance, it is seldom that any business of any account can be secured without duplicating recent bottom quotations. Small lots are quoted as follows, large lots subject to liberal concessions:

Grooved Skelp, delivered.....	1.15¢ @ 1.25¢
Standard Refined Bars.....	1.30¢ @ 1.40¢

Medium quality.....	1.15¢	@	1.20¢
Tank Steel.....	1.20¢	@	1.30¢
Heavy Plates.....	1.30¢	@	1.40¢
Shell.....	1.40¢	@	1.50¢
Flange.....	1.60¢	@	1.80¢
Angles.....	1.20¢	@	1.30¢
Beams and Channels.....	1.40¢	@	1.60¢

Old Material.—There is quite an improved demand, but prices are still at the lowest, with no immediate prospect of improvement. Asking prices are about as follows, delivered in consumers' yards:

Heavy Melting Steel.....	\$10.00	@	\$11.00
Light Melting Steel.....	8.00	@	9.00
No. 1 Wrought Scrap.....	10.00	@	11.00
Machinery Cast.....	9.50	@	10.00
Wrought Turnings.....	8.50	@	9.00
Cast Borings.....	6.50	@	7.00
Old Iron Rails.....	12.00	@	12.50

The Juniata Furnace, at Newport, Perry County, Pa., will go into blast on or about the 16th inst.

Geo. C. Davies, recently with Lee, Chamberlain & Co., who have closed their Philadelphia office, is now associated with C. R. Baird & Co., 46 Bullitt Building.

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, Pittsburgh, April 10, 1894.

The perplexing situation in the Coke region is reflected to considerable extent in the Iron trade. By this it is meant that the trouble in the region is far from being over, notwithstanding the reports in the daily press that the strike is practically settled. The workmen in the region have been assured of protection from violence, but are not returning to work as expected. It is now the impression that at the meeting being held in Scottdale to-day the workmen will agree to return to work on the terms of the Frick scale. If this proves to be the case it is probable that the strike will be prolonged for some time. The men will also likely insist on semi-monthly pay and in cash only, no more store orders to be accepted. The next day or two will bring forth important developments in the Coke struggle, and will show whether the strike is over or is to be continued.

Pig Iron.—The past week has witnessed large sales of Bessemer Iron, some of which were for speculative purposes, and others in the nature of trades. The possibility of a scarcity of Bessemer Pig on account of the Coke strike, which would also lead to higher prices, has brought about one deal in Bessemer involving 10,000 tons, a local firm being credited with the purchase and a Valley furnace with making the sale. An Eastern capitalist is also credited with buying 5000 tons of Bessemer in the Shenango Valley for purely speculative purposes. The figures for the first sale are given as \$10.35, Pittsburgh, while the second was at a slightly higher price. In addition to the above some 15,000 or 20,000 tons of Bessemer have been bought within the past week, the buyers having conversion contracts for Steel. Already the short supply of Coke is having effect in the stoppage of furnaces. Edith of the Hainsworth Steel Company blew out to-day and will be idle for six or seven weeks. A new lining will be put in and other repairs made. The two Shoenberger stacks have been banked, but are expected to resume within a few days. Other stacks will likely be compelled to close

within a few days, unless the supply of Coke gets larger. For the first time in some weeks there have been some large sales of Foundry Iron, but at the lowest prices ever touched. Gray Forge continues weak in price, and there is little or no demand for it. We quote as follows:

Neutral Gray Forge.....	\$9.25	@	\$9.40, cash.
All-Ore Mill.....	9.35	@	9.50
No. 1 Foundry.....	11.00	@	11.25
No. 2 Foundry.....	10.25	@	10.50
No. 3 Foundry.....	9.75	@	10.00
Bessemer.....	10.35	@	10.50

In addition to the sales of Bessemer Iron noted above we are advised of a sale of 500 tons of No. 1 Foundry at a price equal to about \$11, Pittsburgh, and one of 500 tons of No. 3 Foundry at a price equal to about \$9 75, Pittsburgh. None of this Iron comes to Pittsburgh.

Ferromanganese.—The price of domestic 80 % Ferromanganese has been advanced \$1 75 ton and we now quote at \$53, delivered at buyer's mill. We note a sale of 50 tons at that price, equal deliveries in April and May.

Billets.—The Steel market has shown further improvement during the week, both in demand and prices. The unsettled condition of affairs in the Coke region has stirred up buyers and within the last few days there have been many inquiries for Steel, particularly for early delivery. One inquiry involves some 10,000 tons and another about 12,000 tons. In addition to these, there are numerous other inquiries for smaller amounts. In the Pittsburgh district two of the principal makers state that they have all the orders they can take care of for this and next month, and have refused to quote prices for these deliveries. Another maker has set \$16 as the minimum. The other two concerns are also well fixed and the market is firm at \$15.50 @ \$15.75, f.o.b. at the mill. We note a sale of 3000 tons for April and May and one of 1000 for April, at prices equal to about \$15.50 at maker's mill.

Structural Material.—Bids for five Iron bridges to be erected by Allegheny County will be opened in this city on Saturday at noon. Nearly all the prominent bridge builders are bidding on the work. There is a moderate volume of business in Beams and other shapes, but the large orders that count are lacking. We quote as follows: Beams and Channels up to 15 inches, 1.15¢ @ 1.25¢; Angles and Universal Plates, 1.10¢ @ 1.20¢; Tees, 1.25¢ @ 1.35¢.

Plates and Sheets.—A leading mill states that the volume of business to-day as compared with one month ago is larger, with the outlook very favorable. Several good sized orders for Eastern shipment were taken by Pittsburgh last week. We quote as follows: Tank Steel, 1.10¢ @ 1.20¢; Flange, 1.50¢ @ 1.60¢; Shell, 1.30¢ @ 1.40¢; Fire Box Steel, 1.75 @ 4¢, according to quality. Inquiries for Sheets are numerous, and large buyers are endeavoring to cover season requirements. The mills, however, are refusing to book orders for shipment beyond July 1, in anticipation of labor troubles. Prices are somewhat firmer, and higher prices for Sheets in the near future are thought probable. For good sized orders we quote as follows: No. 24, 2.15¢; No. 26, 2.25¢, and No. 27, 2.35¢, at mill.

Bars.—Some mill report an improved condition of affairs, while others say there has been very little, if any, improvement. Summed up as a whole, the assertion is warranted that

there is more business now than at any previous time for two or three months. Some mills are running nearly full, and others to about half capacity. Prices are better to the extent that it is harder to receive concessions on a good order than it was some time ago. We quote Common Iron Bars at 1¢ @ 1.10¢, and Soft Steel Bars at 1.10¢ @ 1.20¢, with the usual extras.

Merchant Steel.—Trade is picking up to some extent in volume of business, but prices show no improvement. Implement makers come into market occasionally, but their purchases are small compared with what they were a year ago. We quote as follows: Bessemer Machinery, 1.30¢ @ 1.35¢; Open Hearth Machinery, 1.57½¢ @ 1.65¢; Open Hearth Spring, 1.70¢ @ 1.75¢; Toe Calk, 1.80¢ @ 1.85¢; Machine Straightened Tire, standard quality, 1.60¢ @ 1.65¢; Cold Drawn Steel Shafting, 2.57½¢ base; Tool Steel, 5¢ @ 7¢ for ordinary grades.

Muck Bars.—This material is entirely neglected. Consumers are overstocked and are trying to sell instead of buying. We make nominal quotations of \$19 @ \$19.50, delivered.

Skelp Iron and Steel.—Demand shows considerable improvement, due to the better outlook in the Pipe and Tube trade. An order for 2000 tons of Grooved Steel Skelp is said to have been placed in this market last week. We quote as follows: Grooved Steel Skelp, 1¢ @ 1.05¢, according to size and order; Sheared Steel Skelp, 1.10¢ @ 1.15¢; Grooved Iron Skelp, 1.15¢ @ 1.20¢; Sheared Iron Skelp, 1.25¢ @ 1.30¢.

Pipes and Tubes.—The outlook has improved to some extent, and makers look for an improved demand from now on as spring trade has opened up. As yet prices have not shown any signs of betterment.

Wire Rods.—A local mill made a sale last week of 100 tons of Rods for prompt shipment at a price equal to \$26 at maker's mill. Very few surplus Rods are to be had at any price.

Barb Wire.—The heavy demand for all kinds of Wire ruling for some months shows no abatement, the mills being pushed to their utmost to turn out product as fast as wanted. Some makers took on more business than they have been able to take care of, and as a result there is considerable complaining being done by buyers over tardy shipments. We quote Four-Point Galvanized at \$2.15 @ \$2.20 in carload lots, and \$2.25 in less quantities. Painted is ruling at \$1.75 @ \$1.80 in carload lots. Plain Wire is unchanged at \$1.35 in carload lots.

Wire and Cut Nails.—The situation in the Wire Nail trade is perplexing and disappointing. The mills have a fair amount of orders and a moderate volume of business is being received, but in spite of this prices are not strong and a general tone of weakness prevails. We quote Wire Nails at 95¢ @ \$1 in carload lots at mill, some mills refusing to shade the higher quotation. The Cut Nail trade is also in unsatisfactory condition, although there is a moderate volume of business. Competition among the mills is very keen, and prices are a shade lower. We quote at 90¢ @ 95¢ in carload lots at mill for the usual averages.

Connellsville Coke.—At this writing the strike in the Connellsville region has quieted down considerably. Nearly all the important works are being

guarded by deputies, and the men at work will have ample protection. It is not improbable that the trouble will be prolonged for some time yet at the works of operators who are paying less wages than the Frick concern. A meeting is being held in Scottdale to-day, and it is thought the Frick scale will be indorsed. Furnace Coke continues to rule at 85¢ @ 90¢; Foundry Coke at \$1 @ \$1.10, all in tons of 2000 pounds f.o.b. cars at oven.

H. S. Shields has opened an office in Room 706 *Times* Building, Pittsburgh, Pa., as broker in Iron and Steel and manufacturers' agent.

The offices of Murdock & Co., brokers in Pig Iron and Steel Billets and Slabs, have been removed from 714 Lewis Block, Pittsburgh, to 317 Ferguson Building, in that city.

St. Louis.

(By Telegraph.)

Office of *The Iron Age*,
Bank of Commerce Building,
St. Louis, April 11, 1894.

Pig Iron.—The reduction of 50¢ $\text{\textcircled{P}}$ ton in freights from Birmingham to this market has not had any benefiting influence on the demand for Pig Iron. It was expected that this reduction would induce buying, but the demand has fallen flat, and the week under review has been bare of sales of any size. Prices are unchanged, but consumers are not yet decided that they have reached bottom, and continue to buy very sparingly. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry	.....	\$10.75 @ \$11.00
Southern Coke, No. 2 Foundry	.....	9.75 @ 10.00
Southern Coke, No. 3 Foundry	.....	9.50 @ 9.75
Southern Gray Forge	.....	9.25 @ 9.50
Southern Car Wheel	.....	16.75 @ 17.75
Lake Superior Car Wheel	.....	16.25 @ 16.50
Ohio Softeners	.....	14.25 @ 14.50

Bar Iron.—The improvement noted in the demand in our last issue continues. The movement is not large, but any change from the extreme dullness heretofore prevailing is warmly welcomed. We quote as follows: Lots from mill 1.10¢, half extras, f.o.b. cars East St. Louis. Jobbers ask 1.30¢ @ 1.35¢, according to quantity.

Barb Wire.—The demand for Barb Wire shows some signs of falling off and prices naturally suffer in consequence. Mills are determined to run full and the future of prices is uncertain. At the moment Painted is quoted at \$1.90 and Galvanized \$2.30. Car-load lots are 5¢ $\text{\textcircled{P}}$ hundredweight less.

Wire Nails.—The Nail market is extremely quiet and the offer of cut prices fails to induce buying. Jobbers and mills appear determined to get all the trade that is going and are making prices accordingly. Manufacturers do not appear satisfied with the larger trade, but are making low prices to the small country trade, thus practically demoralizing this trade. Until they decide to let the small trade alone any improvement in prices seems out of the question. Prices range from \$1.10 to \$1.15 for any quantity.

Rails and Track Supplies.—Outside of a moderate demand for Splices there is no change to note in this department. We quote as follows: Splice Bars, 1.30¢ @ 1.35¢; Spikes, 1.75¢ @ 1.80¢; Bolts are lower; Steel Links and

Pins, 1.60¢ @ 1.65¢; Iron, 1.75¢ @ 1.80¢; Old Iron Rails are offered at \$10, but find no buyers. Steel Rails are in better demand at \$26 @ \$26.50.

Pig Lead.—Slightly lower prices are recorded for this metal, 3.15¢ now being the accepted price. The demand is light, however, and is of a hand to mouth character.

Spelter.—Since our last report, 14 furnaces have closed down, making a total of 74 furnaces now idle which were running at this time last year. It is reported that prices were forced down to 3.35¢ to compel these furnaces to close down, and that lower prices are possible unless additional furnaces are added to the list of idle ones. At the close to-day 3.35¢ was asked, but buyers refuse to pay this price.

(By Telegraph.)

We note later sales of Pig Lead at 3.20¢ and the market closes firm at that price.

Financial.

The failure of the attempt to pass the Bland bill over the President's veto has had a reassuring effect in financial and commercial circles during the past week. A better feeling prevails in the money and stock markets, and the improvement in general business reported in our last review continues, although it has not yet reached the point where better prices are in evidence. Still the movement of products has received a marked stimulus, and trade reports from nearly all sections of the country are taking on a more hopeful complexion. In the published opinions of acute observers the only impediment now existing to the complete restoration of confidence and the return of activity and prosperity in both trade and manufacture is the uncertainty as to the tariff. If the country could know exactly what the final action of Congress would be in regard to the Wilson bill, there is every reasonable assurance that within a limited time all the economic machinery of the country would be again in active operation. Meanwhile the restoration of confidence grows at a very moderate pace. Nevertheless it is growth and not decay, as is evidenced by the fact that the owners of the vast amounts of idle money lying in the care of banks and trust companies are beginning to invest the same in bonds and stocks to a very large extent.

A striking illustration of the reality of the improvement in business conditions is presented by *Dun's Review*, which on Saturday gave full returns of the failures during the first three months of this year. In number and importance these failures show a decided decrease. The aggregate in March was 1005, as compared with 1202 in February, and 2090 in January. The commercial liabilities were \$31,320,867 in January, \$17,930,419 in February and \$14,730,893 in March. Nearly half the commercial liabilities were of firms failing during the first month; much more than half of the trading liabilities, 42 % of the manufacturing liabilities, and 49 % of the other commercial liabilities. Moreover, nearly two-thirds of the banking liabilities were of failures in the first month, and over half of the railroad liabilities. Though the number of commercial failures, 4297 in the United States, was never equaled in any quarter until the third of last year, the average of liabilities is only \$14,890, which is lower than has appeared in the records of 38 years

at any time closely preceding any serious reverse. The degree of commercial soundness and health here indicated gives ground for hope that the effects of the panic of 1893 are being rapidly overcome.

The comparative decreases in railway earnings still continue. These earnings decreased, in the aggregate, about 14.4 % for the first week in April, against 12 % in March. The opening up of spring traffic will, however, it is expected, induce a much more favorable showing for the later weeks of this month. The total bank clearings of the first week in April showed a decrease of 19.5 % compared with last year. This improvement is, however, largely attributable to the usual quarterly payments falling due last week, and is no particular evidence of *bona fide* improvement.

The Treasury holds its gold better than was anticipated. In a statement just issued it is shown that but \$400,000 has been lost in the first 10 days of April. In that time Treasury receipts have aggregated \$7,410,000, indicating a total for the month of \$23,000,000, and the expenditures, exclusive of \$5,500,000 paid on account of interest, have aggregated \$9,416,000, indicating a total for the month of \$28,000,000, or \$5,000,000 more than receipts, to which must be added the interest payments, making the grand aggregate of expenditures over receipts for the month foot up \$10,500,000, thus reducing the net Treasury balance from \$133,950,025 on April 1 to \$124,000,000 on May 1.

Of the net balance of \$133,950,025 on April 1, \$106,149,135 was in gold, and of the stated Treasury balance on April 11, \$132,492,626, or of the true balance, \$127,000,000, \$105,775,000 was in gold, a loss in gold for the month of about \$400,000 only. This satisfactory feature is mainly due to the wholesome effect of the recent veto. Yet the general course of the Treasury is not by any means satisfactory, and is not likely to improve until definite action is taken on the tariff bill.

The weekly bank statement of last Saturday was regarded as more satisfactory than any that has been issued for a long time, as there was an expansion in loans of \$6,627,900, and the surplus reserve showed a decrease of \$2,800,000. The latter still stands, however, at nearly \$81,000,000. The increase in loans, moreover, is explained as not representing any decided growth in the demand for money, but merely the requirements of a syndicate which paid over \$6,000,000 on account of the Cherokee purchase.

The loan market has developed no particular improvement. Money is still in such large supply that banks are glad to accept 1 % on call loans. The ease in the market for call money makes the time loan market extremely dull, as borrowers are now in the habit of regarding call money as equally good as time. The latter is in abundant supply at 2 @ 2½ % for 30 to 90 days, 3 % for 4 to 6 months and 4 @ 4½ % for longer periods. Commercial paper of other than first-class quality is more freely offered, but choice names are still scarce and in active demand. Rates are quoted at 3 @ 3½ % for indorsed bills receivable, 3½ @ 4½ % for choice single names and 4½ @ 5½ % for names not so well known.

Speculation has been active on the Stock Exchange. This was particularly true in the closing days of last week, when the market for all classes of securities was buoyant, with an upward trend of prices. This movement was stimulated by brisk London buy-

ing. This foreign buying has been a marked feature of the market of late, induced by cheaper money than has ever before been known on the other side. It is said to be, however, almost entirely speculative so far. The Grangers were specially favored at the close of last week, owing to the rise of about 3¢ in wheat on statements of damage to the crops. In the early days of the current week, although speculation subsided to some extent, and the market was duller, its strength was fairly well maintained. The most striking feature of the market on Monday and Tuesday was the activity of Richmond Terminal stocks on the assurance of success for the modified plan of reorganization. The stock rose 2½ points to 9½ points. Nearly all the active stocks have scored some slight advance during the week under review, and there is as yet no indication of a culmination in the gradual rise that has now been going on for some weeks. The following list exhibits the fluctuations of some of the more active stocks during the past week, with closing prices on April 11:

	High- est.	Low- est.	Closing Apr. 11
Am. Sugar Ref.....	93½	89½	93½
Atchison, T. & S. Fe....	15½	14½	15
Chicago Gas.....	65½	62½	62½
Chic., B. & Q.....	83½	81½	82½
Chic., Mil. & St. Paul....	65½	63½	64½
Chicago & N. W.....	110½	108½	109½
Chic., Rock Isl. & Pac..	72½	69½	71½
Del. & Hudson.....	144½	138½	140½
Gen. Electric.....	42½	38½	41
Missouri Pacific.....	32½	30½	31½
National Lead, Common.	40½	38½	40½
Philadelphia & Reading.	22½	21½	21½
Richmond & West Pt.			
Term.	9½	7½	9½
Union Pacific.....	22½	20½	21
Western Union.....	85½	84½	85

The market for railway and miscellaneous bonds has been exceedingly strong and active. In the week ending last Saturday the bond dealings increased \$4,400,000 over the previous week, or nearly 35%. Prices have advanced all along the line. Government bonds have been firm and fairly active. The latest quotations are as follows:

	Bid.	Asked.
2's, 1891, registered.....	96	.....
4's, registered.....	114	114½
4's, coupon.....	114	114½
5's, registered.....	118½	118½
5's, coupon.....	118½	118½

Sterling exchange, which weakened materially last week, has reacted to great firmness during the past day or two, on account of the extremely light receipts of commercial bills. Rates have been advanced to near the gold exporting point, and although no arrangements have yet been announced for exporting gold, it is considered not improbable that Saturday's outgoing steamers will take shipments of the metal if the rates of exchange advance any further in the interval. Actual business was done on Wednesday at \$4.87½ for sixty days, \$4.88½ @ \$4.88½ for demand, \$4.88½ @ \$4.89 for cables and \$4.86 @ \$4.86½ for commercial.

Domestic exchange on New York is quoted as follows: New Orleans, commercial 100 premium, bank 150 premium; Charleston, buying par, selling ½ premium; San Francisco, sight 15, telegraph 20 premium; Savannah, buying par, selling ½ premium; Chicago, 75 premium; St. Louis, 90 premium.

Silver declined toward the close of last week nearly 1 penny per ounce to 28½ pence. It has again risen to 28½ pence in London and 62½ cents in New York, with a tendency to go still higher. Exports of the metal have been moderate.

Metal Market.

Pig Tin.—Prices have moved about somewhat feverishly, but the extreme range covered was only about 30¢. The fluctuations were due in a great measure to the ups and downs of the London market. In other words, purely local conditions have had very little influence, if any, in shaping the course of values. The fact that London has a large stock on the spot and an unusual quantity afloat offsets all calculations of supplies, consumption, &c., on this side of the Atlantic, since it is uncertain when or to what extent Tin may be shipped from Europe to the American market. During the early part of the week under review some spot stock was sold at as low as 19.30¢. Subsequently 19.60¢ was paid in remote instances. Directly afterward 15 tons were sold on 'Change at 19.50¢ for prompt delivery, and 15 tons at 19.65¢ for June delivery. At the close the market softened somewhat under the influence of lower London quotations, but 19.50¢ net cash appeared to have been bottom rate for 5-ton lots, prompt delivery.

Copper.—The market for Ingot has remained quiet. At all events, none but very commonplace transactions have been reported, and the demand is represented as being quite as tame as it has been at any previous time during the past month or six weeks. Such as it is, however, the business passing is at practically former prices, and the market retains fairly steady tone despite the spiritless state of business. Lake Superior Ingot is quoted at 9½¢, prompt or future delivery. Electrolytic remains at 9½¢ @ 9½¢, and over 9¢ @ 9½¢ is the exception on casting stock. Exports from the United States during the eight months ending February 28, as per statement of the Bureau of Statistics, were as follows:

Ore—	1894. Tons.	1893. Tons.
To United Kingdom.....	21,959	28,708
To Germany.....	1,016	78
To other Europe.....	none	none
Totals.....	22,975	28,786

Ingot, bars and old—	1894. Lbs.	1893. Lbs.
To United Kingdom.....	47,523,643	1,969,117
To Germany.....	18,160,862	2,260,306
To France.....	24,119,007	7,063,067
To other Europe.....	50,601,917	6,605,578
To other countries.....	508,461	57,787
Totals.....	140,913,880	17,955,875

The February exports of ore were 76 tons, against 1300 tons same month last year. Exports of Ingot, &c., 11,859,339 lb and 2,138,329 lb respectively.

Pig Lead.—The destruction of the concentrator, ore houses and works of the Horn Silver Company, cutting off, as it did, a source of considerable supply and a free selling agency, caused heavy buying of the Metal. Nearly or quite 1500 tons changed hands at prices ranging from 3.37½¢ up to 3.45¢. Subsequently single carloads realized 3.47½¢, and at this writing most sellers are asking 3.50¢. It is considered doubtful that the company will resume work within the next six months, and a firm market for Lead is therefore anticipated should the demand be normal. The Horn Silver mine production was about 600 tons ½ month.

Spelter.—Smelters who became tired of waiting for a better market dropped their prices suddenly a few days ago and the entire market became demoralized, with ordinary Western brands freely offered at 3.60¢ @ 3.62½¢, delivered here or at common point. As yet it does not appear that the lower cost has prompted freer buying by East-

ern consumers and the market seems to be quite as flat as it was before the break took place.

Antimony.—Dealings are moderate, and the market is barely steady, with 8½¢ @ 8½¢ quoted for Hallett's and 10¢ @ 10½¢ for Cookson's.

Nickel.—The market remains quiet, and 40¢ is still quoted as seller's price.

Tin Plate.—A fair business has been done in both spot stock and forward shipments, but the movement contrasts unfavorably with what is customary at this season of the year. Prices are still slightly uneven, with a slight leaning in buyer's favor, particularly for spot goods. We quote as follows: Coke Tins—Penlan grade IC, 14 x 20, \$5.15; J. B. grade, do., full weight, \$5.25; light weights, \$4.80 @ \$4.85 for 100 lb, \$4.70 @ \$4.75 for 95 lb, \$4.60 for 90 lb; Bessemer full weight, \$5.20; light weights, \$4.75 @ \$4.80 for 100 lb, \$4.65 @ \$4.70 for 95 lb, \$4.55 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.40; Siemens Steel, IC basis, \$5.50; IX basis, \$6.60. Charcoals—Melyn grade, IC, \$6.25; Crosses, \$7.75; Allaway grade, IC, \$5.40 @ \$5.50; Crosses, \$6.60; Grange grade, IC, \$5.60; Crosses, \$6.70. Charcoal Terns—Worcester, 14 x 20, scarce; do., 20 x 28, \$11.25; M. F., 14 x 20, \$7.25; do., 20 x 28, \$14.45; D. R. D. grade, 14 x 20, \$5; do., 20 x 28, \$9.90; Alyn, 14 x 20, \$5.20; do., 20 x 28, \$10.25 @ \$10.40. Wasters—S. T. P. grade, 14 x 20, \$4.60; do., 20 x 28, \$9; Abercarne grade, 14 x 20, \$4.50; do., 20 x 28, scarce.

New York.

Office of *The Iron Age*, 96-102 Reade street, }
New York, April 11, 1894. }

Pig Iron.—There has been a sharp cut in freight rates to interior New England points, as indicated by the figures published elsewhere. Yet it is pretty plainly intimated by the railroad companies that special rates are simply a matter of negotiation. The result is that the market here and in New England is unsettled until it is definitely known what can be done. Sellers are practically giving away the whole of the advantage thus secured. Low prices have been made by Schuylkill Valley furnaces in New England. Bessemer Pig, guaranteed 0.06 phosphorus, is being offered delivered in this district at \$13. We also note a sale of 1000 tons of Swedish Pig at private terms. We quote standard brands \$12.50 @ \$13.25 for No. 1: \$11.75 @ \$12.25 for No. 2; \$11.25 @ \$12 for Gray Forge, at tidewater. Southern Iron, same delivery, \$12 @ \$12.75 for No. 1; \$11 @ \$11.50 for No. 2; \$10.75 @ \$11.25 for No. 3; \$11 @ \$11.25 for No. 2 Soft, and \$11.25 @ \$11.50 for No. 1 Soft. Foundry No. 4 (Foundry Forge) is \$10.25 @ \$10.75.

Cast Pipe.—The Buffalo contract is reported to have been placed at \$17.15. On the Syracuse order of about 4000 tons, the successful figures were \$17.80 for the 24, 20 and 16 inch Pipe, \$18.34 for the 10 and 12 inch and \$18.70 for the 8 and 6 inch Pipe. Bids are going in now for a 6000-ton contract.

Ferromanganese and Spiegeleisen.—We continue to quote \$51 @ \$51.50 for domestic Ferromanganese, tidewater, and for foreign Spiegeleisen, nominally \$21 @ \$22 for 10%, and \$24.50 @ \$25 for 20%, ex-ship.

Billets and Rods.—The market in this district is very dull. We quote \$17.50 @ \$18 for domestic, and nominally \$27 @ \$27.50 for foreign. Domestic Wire Rods are nominally \$27.25 @ \$27.50, and foreign \$39 @ \$40, tide-water. We note a sale of a small lot of Wire Rods.

Steel Rails—From the West come reports that the practice is growing almost universal of quoting a delivered price on standard sections. Eastern mills quote \$24.80, tidewater. Light Rails remain at \$23 50 @ \$25, according to section. Girder Rails are selling at \$22 @ \$24, at mill.

Track Material.—We quote as follows for small lots: Spikes, 1.60¢ @ 1.80¢; Fish Plates, 1.20¢ @ 1.40¢; Track Bolts, Square Nuts, 2¢ @ 2.10¢, and Hexagon Nuts, 2.20¢ @ 2.30¢, delivered.

Manufactured Iron and Steel.—Eastern mills report having taken orders for about 1500 tons of Structural Material, including 500 tons for the Doelger brewery. For the false work for the Park avenue improvement, quite a considerable quantity has also been closed. The reports that the contract for the Coffee Exchange had been taken by an Eastern mill were premature. The Tract Society Building is also about to be closed. While some of the mills have withdrawn, there are a sufficient number of Western and Eastern mills eager for work to keep prices down to the very lowest notch. Some extraordinary prices are being made on Iron sheds and roofs. They are being erected complete at figures which a few years since would not have covered the cost of the raw material. A transaction has been recently made in this city in Plates, the character of which should be fully understood, so that the price accepted be not used to the detriment of manufacturers. We understand that 500 tons were sold by a Pittsburgh mill to a safe concern at 75¢ per 100 pounds at mill. This material, well rolled, is understood to be Boiler Plate which failed to come up to the physical tests demanded. Comparatively little has been heard during the past week of the Valley mills in the Bar trade. We present elsewhere an interview on the Cotton Tie situation. Buyers have become convinced that there is little chance for foreign Ties this season, and fair orders are being booked. We quote: Beams up to 15-inch, 1.30¢ @ 1.50¢, for round lots; Angles, 1.20¢ @ 1.35¢; Universal Mill Plates, 1.15¢ @ 1.35¢; Tees, 1.40¢ @ 1.60¢; Channels, 1.30¢ @ 1.50¢, on dock. Steel Plates are 1.20¢ @ 1.30¢ for Tank; 1.35¢ @ 1.40¢ for Shell; 1.55¢ @ 1.60¢ for Flange, and 1.75¢ @ 2¢ for Fire Box, and 2¢ @ 2.25¢ for Locomotive Fire Box, on dock; Refined Bars are 1.20¢ @ 1.9¢, on dock, and Common 1.10¢ @ 1.20¢; Soft Steel Bars are 1.15¢ @ 1.30¢; Scrap Axles are quotable at 1.35¢ @ 1.50¢, delivered; Steel Axles, 1.35¢ @ 1.50¢, and Links and Pins, 1.40¢ @ 1.60¢; Steel Hoops, 1.45¢ @ 1.50¢, delivered; Cotton Ties, 60¢ @ 70¢ # 45-lb bundle, at mill; Machinery Steel, 1.20¢ @ 1.40¢; Toe Calk, 1.80¢ @ 1.90¢, and Sleigh Shoe, 1.60¢ @ 1.75¢, delivered.

Stock Warrants.—The American Pig Iron Storage Warrant Company report as follows, under date of April 4, 1894:

	Tons.
Stock in yard, February 28.....	83,400
Put in yard for 31 days, ending March 31.....	7,600

Withdrawn, 31 days, ending March 31.....	\$00
Net stock in yard March 31, 1894.....	\$6,100

J. H. L. Todd, agent in this country of Ekman & Co. of Gothenburg, Sweden, has moved his offices from 67 and 69 William street to 11 and 13 William street.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, April 11, 1894.

Pig Tin prices have been irregular and influenced more or less by the fluctuations in Silver, although large, under speculative control. The decline in Silver early in the week caused a break to £69 for prompts. From that point there was an irregular recovery, due to improvement in Silver and more active speculative buying. This resulted in a rise to £70. 5/ for prompts. To-day the market is easier. Prompts sold at £69. 17/6 and three months' futures at £70. 15/.

Copper has been weak and merchant Bar prompts finally sold down to £40. 12/6. There was good buying at intervals, but leading operators lend little support, and the market is awaiting improved American reports. Pharsis and Mason Company's dividend 2 per cent. The market closed flat with Merchant Bar prompts quoted at £40.12/6, three months' futures at £41. 2/6 and best Selected English at £43. 15/.

Tin Plate is rather dull. Small orders for Cokes are more plentiful at bottom rates, but the total is small. Sellers are cautious regarding forward contracts, owing to probability of stoppage of more works, possible labor troubles and belief that prices have reached lowest point. Stocks at Swansea about 287,000 boxes. Exports in March 25,000 tons, against 42,000 tons last year. Shipments to the United States 16,000 tons and 31,000 tons respectively. Liverpool quotations for Plates were as follows:

IC Charcoal, Alloway grade.....	12/ @ 12/6
IC Bessemer Steel, Coke finish.....	11/8 @ 11/6
IC Siemens.....	11/6 @ 11/8
IC Coke, B. V. grade, 14 x 20.....	Nominal.
Charcoal Terne, Dean grade.....	10/3 @ 10/6

Pig Lead has been steady at £9. 5/ for soft Spanish, with business moderate.

Spelter remains firm at £15. 17/6 for ordinary Silesian, but there is only a moderate business.

Iron and steel generally have remained quiet. The only exception is steel rails, orders for which have increased the past few days. Exports of Pig Iron last month 63,000 tons, against 51,000 tons in March, 1893. Last sales of warrants were at 42/10 @ 42/11 for Scotch, 36/1½ @ 36/3 for Cleveland and 45/4½ for Hematite.

CONTENTS.

	PAGE.
Niagara Falls Inverted Geyelin-Jonval Turbines. Illustrated.....	695
Drilling Nickel Steel Armor Plate.....	697
Tariff Criticism in Canada.....	697
Blow Holes in Armor Steel.....	697
The Cotton Tie Situation.....	698
Mesaba News.....	698
A New Aluminum Solder.....	698
The Lucas Combined Engine and Boiler. Illustrated.....	699
Canada's Iron and Steel Markets.....	699
The Foundrymen's Association.....	700
Southern Pig Iron Freights.....	705
Compulsory Labor Insurance.....	708
The Pratt & Whitney Pillar Shaper. Illustrated.....	707
San Francisco News.....	707
The Week.....	708
Economy of Superheated Steam.....	708
Editorials:	
The Revenue Under the Proposed Tariff.....	709
Puddled Iron in Great Britain.....	709
Railroad Advantages (?).....	709
New Tools in Dull Times.....	710
Factory Hours in England.....	710
Increasing Pig Iron Production.....	711
Washington News.....	712
Personal.....	713
The World's Fair Buildings.....	713
Chicago Builders and Walking Delegates.....	713
Southern Freight Rates.....	713
Manufacturing:	
Iron and Steel.....	714
Machinery.....	714
Hardware.....	714
Miscellaneous.....	715
The Iron and Metal Trades:	
Chicago.....	715
Philadelphia.....	716
Pittsburgh.....	717
St. Louis.....	718
Financial.....	718
Metal Market.....	719
New York.....	719
British Iron and Metal Markets.....	720
Hardware:	
Condition of Trade.....	721
Notes on Prices.....	721
Immigration and Skilled Labor.....	722
Minneapolis Hardware Association.....	723
G. & F. Cash Balance Slip and Fox's Draft Book.....	723
The Hardware Club of New York.....	723
Requests for Catalogues and Prices.....	723
The Bicycle Cities.....	724
Letters from the Trade.....	724
Trade Items.....	724
New Brass List.....	725
Pushing Spring and Summer Goods.....	726
H. D. Edwards & Co.'s Catalogue.....	726
Price-Lists, Circulars, &c.....	726
It Is Reported.....	727
Paints and Colors.....	727
Wheeler's Automatic Groover. Illus.....	728
The McKim All Metal Measure. Illus.....	728
Standard Vibrator Push Button Door Bell. Illustrated.....	729
Combined Money Drawer and Cutlery Showcase. Illustrated.....	729
New Adjustable Bit Wrench. Illus.....	729
Ayers' Combined Hand Planter and Hoe. Illustrated.....	730
Set of U. S. Auger Bits in Canvas Rolls. Illustrated.....	730
New Model Crane Smoker. Illustrated.....	730
Jackson Colonial Latch Lock. Illus.....	731
The Quick Wrench. Illustrated.....	731
Improved Rapid Ice Breaker. Illus.....	731
Maine Creamery Can. Illustrated.....	731
New Vibrator Turn Door Bell. Illus.....	732
Hanks' Water Filter. Illustrated.....	732
Eclipse Hand Corn Planter. Illus.....	732
Current Hardware Prices.....	733
Current Metal Prices.....	740

HARDWARE.

Condition of Trade.

TRADER CONTINUES somewhat uneven in volume, there being complaint in regard to it in some sections, while from others reports indicate that business is on the whole improving, though not attaining to the volume of last year. The demand, however, is more uniform than it has been for some time, covering as it does a more general assortment and indicating a return of a healthful condition. There is still evidence of great caution on the part of merchants in purchasing, and it is apparent that business is still moving somewhat sluggishly. The cold, inclement weather which has prevailed in many parts of the country has had the effect of repressing business somewhat. We regret that we are not justified in referring to the state of the market in the matter of prices as showing signs of improvement. On the contrary, there has been a gradual settling in the prices of many goods for some time, manufacturers making all possible concessions with a view to inducing business. The fact that wages have been quite generally reduced and have still a downward tendency has its influence in the same direction, and the result has been that on many lines of staple and Shelf Hardware lower prices are now ruling than prevailed a few months ago. The large buyers for the most part get the benefit of these reduced quotations, but there is a disposition on the part of many manufacturers to sell retailers in fair lots at prices which approximate those at which they sell the jobbing trade. There is also among the jobbing houses a disposition to cut prices on many leading goods. As a consequence of these conditions the market as a whole is in an unsettled state with a downward tendency. This naturally induces especial care in buying goods, merchants with scarcely any exceptions limiting their purchases to their early requirements.

Chicago.

(By Telegraph.)

The first week in April has proved a disappointment to Shelf Hardware jobbers. The volume of business has fallen considerably below that of the corresponding period in March. It had

been hoped that the spring demand would extend over the month of April, but the trade was evidently without sufficient strength to carry it much further than the first. The falling off extends to all classes of goods and appears to be equally distributed throughout the city and country trade. The city trade is of course affected by the building troubles. The Heavy Hardware jobbers report about the same condition of affairs in their branch. March was an exceedingly good month, but with the recurrence of cold weather the demand for Heavy Hardware immediately declined. Business is now dragging.

St. Louis.

(By Telegraph.)

The month of April opened auspiciously for the jobbing Hardware trade. The past week, however, has been cold and rainy, and trade has suffered in consequence. The Southern trade particularly is feeling the effect of this weather, and unless the weather improves very soon a large part of that trade will be practically lost. Jobbers generally report a falling off in trade in comparison with last year. Although the month of March showed up much better than was expected, prices continue to be subject to shading, and in this category the following articles seem to head the list: Wire Nails, Carriage Bolts, Barb and Plain Wires, Axes, Screws, Black and Galvanized Iron. Some of the prices named for the above articles are so low that the only conclusion to arrive at is that they are sold at less than cost.

Notes on Prices.

Wire Nails.—The demand continues good, manufacturers being in receipt of some relatively large orders from jobbing houses and a good many orders of moderate size from the smaller trade. The aggregate of business is fair, and the mills are generally well supplied with orders. They are, however, desirous of securing business to keep their mills in operation for the next month or two. Competition is thus active and prices relatively low. Ninety-five cents at mill for round lots probably represents the market, some manufacturers being unwilling to make this price, however, except on especially large and attractive lots. There is, however, little difficulty in obtaining this figure on carload lots. Small lots from store in New York are held at \$1.20 to \$1.25.

Chicago, by Telegraph.—Jobbers appear to have control of the business now coming up. The quotations they

make on carloads are as low as manufacturers' prices. This causes the Wire Nail market to appear weaker than the facts would justify, although some decline has taken place in manufacturers' prices. The competition is, perhaps, greater for business in this city than in outside territory. Carload lots are quoted at \$1.05, Chicago, while small lots from stock sell at \$1.15 to \$1.20.

Cut Nails.—The condition of the Cut Nail market is substantially the same as last week, with some unevenness in quotations, especially as the Eastern manufacturers are feeling to some extent the effect of Western competition. The price of Nails in car lots, delivered in New York, is 95 cents to \$1 base. Small lots from store in New York are held at \$1.10 to \$1.15, with concessions on larger lots.

Chicago, by Telegraph.—Little is now heard of the attempt of the Ohio River manufacturers to sell in this market. Local manufacturers report a fair trade for the week, but the volume of business is somewhat below the average of the previous weeks. Prospects are good for a fair trade with the Dominion of Canada in consequence of the reductions in the tariff. Inquiries are being received from numerous Canadian points. Factory prices are unchanged at \$1 on 55-cent average. Small lots are selling from stock at \$1.15.

Barb Wire.—The demand for Barb Wire continues good, though not so heavy as a few weeks ago. There is also evidence of some irregularity in prices, and some of the manufacturers are making concessions on the regular quotations on Four Point Galvanized, delivered, which are as follows: Pittsburgh, \$2.15; Cleveland, \$2.20; Cincinnati or Allentown, \$2.25; Chicago or New York, \$2.35.

Chicago, by Telegraph.—Business has fallen off considerably within the past week or ten days. Buyers generally appear to have covered their wants, and the trade will now experience a period of dullness until stocks pass into consumers' hands. Manufacturers are also again taking control of the trade with consumers. Inquiries for both Plain and Barb Wire are being received from Canadian points, and some sales have already been made. Prices on Galvanized Barb Wire are unchanged at \$2.25 to \$2.30 for carload lots, and \$2.35 to \$2.40 for small lots from stock.

New Brass List.—We print on another page a new list adopted April 9 by the Brass manufacturers. The list thus revised corrects many inequalities

in the old list, and with the new discount makes an advance in some goods, especially in Brass Tubing, the new prices of which are considerably higher than the old. The list prices of some of the goods have been revised simply with a view to making them, with the rest of the list, subject to a uniform discount of 40 per cent.

Bright Wire Goods.—The market for Bright Wire goods, which continues an open one, has recently been characterized by active competition between the different manufacturers, with the result of inducing considerably lower quotations than have heretofore prevailed. As a result a discount of 90 and 20 per cent. is obtainable. There is, however, some inequality in the prices quoted by the manufacturers, and some of them refuse to meet the extreme prices of their competitors.

Cordage.—The Cordage market is in no better condition than last week and prices are a shade lower. Manila is now more frequently sold at 6 cents base than it was a week ago, but some of the manufacturers are still holding it at 6½ cents, these figures applying to large lots. Sisal is quotably lower, being now readily obtainable at 4 cents base. New Zealand is held at the same figure, but with a moderate demand. Notwithstanding the low prices which are ruling the volume of business is only fair, as current quotations seem to have little effect in inducing the trade to purchase beyond their present requirements.

American Pruning Shear.—This Shear was described in *The Iron Age* March 29. It is put on the market by the Gibbs Mfg. Company, Canton, Ohio, who are selling it to the trade at \$5.50 per dozen net.

Improved Adjustable S Wrench.—This Wrench was described in our issue 29th ult. as put on the market by the Bemis & Call Hardware & Tool Company, Springfield, Mass. It is sold from the following list, which is subject to a discount of 35 and 5 per cent.:

8	10	12	14 inch.
\$9	\$12	\$15	\$21 per dozen.

Hose Menders.—Announcement is made that a combination has been agreed to by C. E. Hudson & Co., Leominster, Mass., and Prescott Bros., 54 and 56 Cornhill, Boston, owners of the Hudson Patent Hose Menders, and M. D. Jones & Co., 368 Washington street, Boston, owners of the Jones Patent Hose Menders, whereby these Hose Menders can now be sold by either of the above firms at the lowest manufacturers' prices, regulated as heretofore by the quantity purchased in a single order. This arrangement will enable the retail and jobbing trade to buy both of these Hose Menders from either of the above firms.

Anti-Rattlers.—Johnson's Anti-Rattlers, manufactured by Johnson's Anti-Rattler Company, Danville, Pa., and

illustrated in *The Iron Age* April 5, 1894, are sold at \$1.25 per dozen pairs, net.

Bells.—The following is the price-list of the Acme Bell & Device Company, Lancaster, Pa., and 11 Gold street, New York, the list being subject to a discount of 33½ per cent.:

No.	Per dozen.
00. Acme Door Gongs.....	\$18.00
<i>Acme Push, Pull and Turn.</i>	
1. Polished Bronze.....	18.00
2. Chased ".....	18.00
3. Filled, Chased Bronze.....	18.00
4. Antique Bronze.....	18.00
5. Oxidized ".....	18.00
6. Plain Nickeled.....	18.00
7. Chased ".....	18.00
8. Oxidized ".....	18.00
9. Plain Silver.....	24.00
10. Chased ".....	24.00
11. Oxidized ".....	24.00
12. Polished Bronze (beaded plate).....	18.00
13. Plain Nickeled.....	18.00
14. Plain Silver.....	24.00

Challenge Door Bell.

15. With Plain Copper Knob.....	12.00
16. " Antique ".....	12.00
17. " Dark Finish ".....	12.00
18. " Nickel Plated ".....	12.00

Acme Hotel Call Bell.

19. Polished Bronze.....	42.00
20. Nickel.....	48.00
21. Triple Silver Plate.....	60.00

22. Family Call.....	15.00
23. " ".....	15.00
24. " ".....	21.00
25. " ".....	36.00
26. Acme Bicycle Bell.....	18.00
27. " ".....	24.00
28. " ".....	36.00
29. " " Lock.....	9.00

	Each.
30. Peerless Gong.....	3.75
31. " ".....	4.75
32. " ".....	9.00
33. " ".....	11.00
34. " ".....	15.00
35. " ".....	20.00
36. Rex ".....	5.00
37. " ".....	6.00
38. " ".....	10.00
39. " ".....	12.00
40. " ".....	16.00
41. " ".....	21.00

Steel Belt Lacing.—The Bristol Company, Waterbury, Conn., and 121 Liberty street, New York, issue the following revised list, which includes a number of new sizes, of their Bristol's Patent Steel Belt Lacing, and which is subject to the following discounts f.o.b. Waterbury:

	Per cent.
1 box, 100 inches.....	50
5 boxes, 500 ".....	55
10 " 1,000 ".....	60

For Leather Belts.

No.	Per 100 inches.
00 For Split Leather and Extra Light Belts from 1/16 to 3/8 inch thick....	\$1.00
0 For Split Leather and Light Belts from 3/8 to 3/16 inch thick.....	1.00
1 For Ordinary Single Leather Belts from 3/16 to 1/4 inch thick.....	1.50
2 For Extra Heavy and Wide Single Leather Belts from 1/4 to 5/16 inch thick.....	2.00
3 For Double Leather Belts from 5/16 to 3/4 inch thick.....	2.50
4 For Heavy Double Leather Belts from 3/4 to 7/16 inch thick.....	3.00
5 For Extra Heavy Double Leather Belts from 7/16 to 9/16 inch thick.....	3.50

For Rubber, Cotton and Woven Belts.

100 For Lightest Rubber and Cotton Belts from 1/16 to 3/8 inch thick.....	1.10
10 For two-ply Rubber and Cotton Belts from 3/8 to 3/16 inch thick.....	1.10
11 For three-ply Rubber and Cotton Belts from 3/16 to 1/4 inch thick.....	1.65
12 For four-ply Rubber and Cotton Belts from 1/4 to 5/16 inch thick.....	2.20
13 For five-ply Rubber and Cotton Belts from 5/16 to 3/4 inch thick.....	2.75
14 For six-ply Rubber and Cotton Belts from 3/4 to 7/16 inch thick.....	3.30

15 For seven and eight ply Rubber and Cotton Belts from 7/16 to 9/16 inch thick..... 3.85

Suction Faucet.—In our last issue we described Suction Faucet No. 64, put on the market by the Enterprise Mfg. Company of Philadelphia. This Faucet is sold to the trade at \$5 each, subject to a discount of 25 and 10 per cent.

Aluminum Chafing Dish.—Wohler Aluminum Company, 55 Jackson street, Chicago, are putting this article on the market, a description of it having been given in *The Iron Age* March 22. The Chafing Dishes are listed at \$12 to \$14, the discount to the trade being 50 per cent.

Glass.—The improved condition of the Glass market referred to in our report of last week continues, and manifests itself by a tendency toward stiffer prices. Prices that have ruled for some time have been far from satisfactory, and with the prospective spring demand manufacturers are hoping for some concerted action among themselves toward securing better prices. This movement is more pronounced throughout the western natural gas belt, though it is reported that some Pittsburgh manufacturers have withdrawn their former quotations. The New York Glass market is represented by the following quotations: In small quantities, single strength, 85 and 5 per cent. discount; double strength, 85 and 10 per cent. discount. In 1000-box lots, single strength, 85 and 10 per cent., and double strength, 85 and 10 and 10 per cent. discount. Pittsburgh quotations are reported as being 85 and 10 per cent. discount for single, and 85 and 15 per cent. discount for double strength Glass at factory. The demand for Plate Glass, it is understood, is improving, though no change has taken place in prevailing quotations, and are reported from Pittsburgh as being 70 and 10 and 5 per cent. discount.

Immigration and Skilled Labor.

A T A RECENT MEETING of the Manufacturers' Association of Kings and Queens Counties, held at Brooklyn, H. B. Haigh, president, called the attention of the members to the matter of immigration, referring to it as follows:

I learn from reliable sources that there are thousands of skilled laborers who come to this country in the spring, work at from \$3.50 to \$4.50 per day during the spring and summer, and return to their foreign homes in the autumn, taking with them their earnings. These aliens, although skilled, industrious and frugal, indicate no desire to become permanent residents and citizens of our country, and as they in no wise contribute to the support of our American institutions, they bring American labor into unfair competition with them and should be restricted. In the face of the fact that thousands of our citizens are unable to secure employment, and many are

obliged to seek aid from the various bureaus of relief, it is in order to search statistics and discover to what extent unlimited immigration has contributed to the disastrous winter through which we have just passed.

The Department of Charities of New York City during the year 1893 supported 84,628 foreign born persons, from which it would seem that immigration from foreign lands of persons unable or unwilling to support themselves should be stopped. It is alike unjust to our working classes and public charities. Statistics show that a large proportion of the immigrants now coming here are incapable of self support, and as shown by statistics for the past ten years 5,246,613 persons have landed on our shores, and during 1893 the number of arrivals was 502,917.

I certainly consider the subject of immigration of sufficient moment to warrant the attention and study of our association, and trust that our Committee on Information will look into the matter of statistics; that our Committee on Entertainment will provide speakers who are posted on the subject, and after due consideration on the part of the Committee on Legislation, if found advisable, that an appeal be made to Congress for the necessary remedy.

Minneapolis Hardware Association.

THE MINNEAPOLIS HARDWARE ASSOCIATION, which was organized February 6, 1894, has issued a pamphlet containing the constitution and by-laws and explaining the objects and purposes of the association. Any person or firm who may be regularly in the retail Hardware business, in good standing, carrying a general assortment of stock and doing business in Minneapolis, is qualified for membership, and the object of the association is to promote the interests and to secure the friendly co-operation of Hardware dealers. The officers of the association are as follows:

W. K. MORISON, President.
C. F. STREMEL, Vice-president.
F. R. WARNER, Treasurer.
F. L. STODDARD, Secretary.

Directors.

C. F. STREMEL, H. B. GARDNER,
J. STOTT, H. S. CLEVELAND,
F. R. WARNER, J. C. PIERSON, JR.,
J. E. NASH, C. BOEHME, JR.

The following are the members of the association:

W. K. MORISON & Co.
STREMEL BROS.
F. R. WARNER.
J. STOTT.
H. S. CLEVELAND & Co.
H. B. GARDNER.
J. E. NASH.
PIERSON HARDWARE COMPANY.
G. BOEHME & SONS.
STODDARD HARDWARE COMPANY.
E. O. ROGNAS.
OTTO ROOD.
S. N. BRADEN.
ANDERSON BROS.
P. E. OLSEN.
OHIO STOVE COMPANY.
GEO. O. BRIMHALL.
PETER FABER.
EUGENE SMITH.

Regular meetings are to be held on the first Tuesday of each month and the annual meeting on the first Tuesday in February. The annual dues are \$2. The following statement in regard

to the formation of the association and the accompanying resolutions indicate the scope and purpose of the organization:

At a preliminary meeting of a number of the retail Hardware dealers of Minneapolis, held November 16, 1893, it was decided to organize a Hardware Dealers' Association, and a committee of five was selected to draft the constitution and by-laws of this association, and as far as possible secure the co-operation of all the retail Hardware dealers of this city. The need of organized effort in maintaining reasonable prices and to protect ourselves from inroads of manufacturers and jobbers, and particularly to promote a general feeling of confidence, was fully recognized.

Resolved, That the causes of complaint are substantially as follows: The treatment accorded to us by manufacturers and jobbers, in that they permit their goods to get into the hands of persons not dealers at practically the same prices as those charged to dealers, thus denying reasonable protection to said dealers after selling them large lines of goods, and the over anxiety of our brethren to sell goods, resulting in unremunerative business. In view of these facts, be it further

Resolved, That we request manufacturers and jobbers to confine the sales of their wares to regular dealers, and that each and every member of this association pledge himself to use all reasonable effort to enforce this demand.

Resolved, That if any manufacturer or jobber furnish goods to any one not regularly engaged in the retail trade, the dealers affected shall report the same to the secretary, with affidavits or other proper proofs. The secretary shall then communicate with the offending manufacturer or jobber and endeavor to adjust the matter, and in event of failure to so adjust a complaint, when the evidence is conclusive, the secretary shall report the facts in the case to the members of the association.

Resolved, That all members of this association shall by a united effort endeavor to encourage and promote a friendly feeling among its members, with a view of discouraging unfair competition, with the laudable object of assisting each other to do a prosperous business, fully realizing if this principle is carried out it means much good to every member and injury to none.

Resolved, That a cordial invitation is hereby extended to all regular and legitimate retail Hardware dealers doing business in the city of Minneapolis to join this association, and that they send to the secretary the amount of dues for one year and receive certificate of membership.

G. & F. Cash Balance Slip and Fox's Draft Book.

IRVING P. FOX, 8 Oliver street, Boston, issues the G. & F. Daily Cash Balance Slip, bound in flexible paper covers, containing over 50 leaves. Down the left hand side of each slip are specified spaces for former balance, checks, gold, bills from \$1 to \$100, silver from 10 cents to \$1, nickels, pennies, due bills, and balance. The advantages claimed for the slip are that it is simple and makes errors much less liable to occur, and when made, much more easily traced. There are over 50 slips in each book, so that it is an easy matter to turn back and find the exact condition of the cash on any particular day. The book is made from engraved plates, printed on a good quality of paper.

Fox's Complete Draft Book, issued by Mr. Fox, unites under one cover the draft, letter to cashier of bank, and

a complete list of banks, alphabetically and conveniently arranged, which, it is stated, has been carefully corrected up to date. The point is made that the drafts, letter and stub all being on the same sheet, it is a much easier matter to fill them out than it would be if they were on separate pieces of paper; also that the stub gives a concise and convenient record of the entire transaction. Each book contains 100 pages of drafts, letters and stubs, lithographed on fine paper, besides the list of banks, and is neatly and substantially bound.

The Hardware Club of New York.

THE POSTAL TELEGRAPH BUILDING is approaching completion and the quarters to be occupied by the Hardware Club are substantially finished. The club are expecting to take possession in May, orders having been placed for furniture, carpets, fittings, &c., needed for club purposes. The elevators in the building are in operation and access to the rooms may be had by any of the members who desire to visit them. Only in this way can an adequate appreciation be obtained of their extent, convenience and attractiveness and of the magnificent view which is had from them of the bay and surrounding country.

At the last meeting of the Board of Governors the following gentlemen, whose applications for membership had been received, were elected members of the club:

GEORGE C. CLAUSSEN,
Park Commissioner, New York.
ROBERT A. CRAIG,
Times Building, New York.
W. P. DEWITT,
280 Broadway, New York.
STEPHEN FARRELLY,
39 Chambers street, New York.
OSCAR GOERKE,
53 Murray street, New York.
J. A. GOODRICH,
92 Centre street, New York.
I. FRED. HOBART,
27 Murray street, New York.
ALFRED J. JOHNSON,
261 Broadway, New York.
ALTON H. KIMBALL,
280 Broadway, New York.
JAMES RORKE,
40 Barclay street, New York.
FRANK VAN NAME,
12 Murray street, New York.
E. M. WATSON,
Jersey City, N. J.

Requests for Catalogues and Prices.

BARR HARDWARE COMPANY is the style of a new concern who have started in business at Nashua, N. H. The company advise us that they would be pleased to receive copies of circulars, catalogues, &c., from Hardware manufacturers.

A. G. FERDINAND & Co., 398 Washington street, Boston, advise us that they are desirous of buying a line of

fancy Hardware, Cutlery, Silverware, Dog Collars and notions for spot cash. They would like to be quoted prices on these goods.

The Bicycle Cities.

ACCORDING to an article recently published in the *Toledo Blade*, the city of Toledo, Ohio, now ranks third in the list of important Bicycle producing cities in the United States. Chicago, however, leads all competitors, having within her borders 25 Bicycle factories. Hartford, Conn., is second in importance, having three large factories that turn out first-class goods. She has the honor of having the largest factory in the United States, the Pope Mfg. Company, which turns out the Columbia wheel.

Toledo ranks next to Hartford, having four factories. The other cities are Springfield and Boston, Mass., which rank in the order named. Springfield has three factories and Boston eight.

Toledo, it is claimed, turns out more high-grade wheels than any one city in the United States. Her four factories are manufacturing daily, in these precarious times, 235 Bicycles, and employ 900 men.

The H. A. Lozier Mfg. Company have the second largest plant in the United States. It is located in Auburndale, near the Lake Shore tracks, and covers nearly an acre. All machines used in the construction of their Bicycles are made in the company's factory. The plant was started in 1889, in modest quarters that have rapidly grown to their present size. More additions are contemplated. The company now employ 500 men and are turning out from 80 to 125 wheels a day.

Opposite the Toledo Driving Park, in Auburndale, is located the plant of the Yost Mfg. Company. During the summer, while crowds cheer on to victory their favorite horse, 200 men are busy in the factory grinding out Bicycles. At present they are making 50 wheels a day and running to their full capacity. This company manufacture the Salscorn wheel. Messrs. Yost and Lozier were formerly partners, but in 1892 dissolved, and Mr. Yost organized the Yost Mfg. Company.

In 1890 the Gendron Iron Wheel Company commenced the manufacture of Bicycles, in connection with the iron wheel business, and made large additions to their factory for that purpose. They employ 150 men in the Bicycle department, and are now turning out 40 wheels daily.

The Toledo Bicycle Company have recently undergone some changes, and the plant is now owned and operated by John B. Meilink. The factory is located on Cherry street, and employs 50 men. An average of 20 wheels a day is manufactured. The company had been in existence four years when the dissolution took place and a receiver was appointed.

Letters from the Trade.

The Nail Card.—Referring to the disadvantage from the retailer's standpoint of the present Nail card, and suggesting that the base size should be 10d, we have the following communication from a retail Hardware concern in a small town in Virginia which has principally country trade:

The present card of Nails is liable to do more harm to retailers than others. We think the card entirely wrong for many reasons. We think 10d should

be the base, as a very much larger quantity of them are sold than of any other, and when a country customer, or a town customer either, asks the price of Nails and does not specify size he means 10d. Then, again, very few, if any, consumers know anything about the extras on small sizes, and when they see Nails quoted at 90 cents, \$1, &c., it creates the impression that Nails are lower than they really are, and they think the merchant is charging them an enormous profit. Again, we think when Nails are quoted they should be quoted so that an order could be made for just such sizes as are needed and the merchant not have to buy an overstock to bring up the average. We do not see why Nails should not be sold as other goods are, so that each keg (it matters not what size) should bring the manufacturer or dealer a fair profit, and not oblige some dealers to pay more for what they buy than the Nails are worth, while others pay less.

Trade Items.

THE GILBERT & BENNETT MFG. COMPANY, 148 Lake street, Chicago, are now manufacturing Poultry Netting at their Chicago factory. It is made of wire galvanized before weaving. The company state that while they do not regard it equal in durability and strength to standard "G. & B." Netting galvanized after weaving, it is made of as good material, as perfectly woven and rolled up in the same manner as all other Netting of the same kind. The company are therefore prepared to furnish the trade with either kind of Netting, galvanized before weaving or galvanized after.

EMPIRE FORGE COMPANY, Lansingburg, N. Y., have bought all the real estate and personal property of the Empire Portable Forge Company, and will continue the business in all its details. The specialties of the company are Portable Forges, Hand Blowers, Sash Pulleys, Vitrified Emery Steels, Shoe Daubers, &c.

AMONG the Special Notices will be observed the announcement of an auction sale of Safety Bicycles by E. Bissell, Son & Co., 12 Murray street and 15 Park place, New York, on Thursday, April 19. This sale will be absolutely unreserved. It will comprise about 200 medium and high grade American and English Cushion and Pneumatic Tire Wheels. The machines will be on exhibition on Wednesday, April 18.

AS REPORTED in our columns, the establishment of the Scott Hardware Company, Paducah, Ky., was entered by burglars March 12, who carried off the entire stock of Pistols, valued at \$200 to \$300. Owing to the efficiency of the local police force, however, the thieves were jailed and all the goods recovered by the morning of March 15. The company have been broken into so often, the above being their twelfth experience, that, as they facetiously remark, they evidently know just how to proceed to catch the fellows.

JOHNSON BROS. HARDWARE COMPANY, Cincinnati, Ohio, have removed from their late location, northeast corner of Fifth and Central avenues, to larger and more commodious quarters at 93 West Pearl street, where they will continue the wholesale Hardware business only. The new quarters have been arranged with special regard to the demands of their increasing trade, and with increased facilities the company will be in much better position to serve the wants of their trade. Geo. B. Johnson is president of the company; W. C. Johnson, vice-president and

manager; Harry C. Bates, secretary, and John A. Somermeier, treasurer.

AN ITEM in our issue of March 29, relating to a new label for Steel Spring Wire Blind Fasteners, erroneously gives the name of the manufacturer as L. M. instead of E. M. Richardson. We are further advised that the Waltham Fasteners are now being turned out more perfect than heretofore by the aid of improved machinery.

AVERY STAMPING COMPANY, Cleveland, Ohio, advise us that Mervin S. Near of New York will represent their interests in the East, while A. E. Bronson of Cleveland will look after their welfare in the West.

THE CHICAGO TIN PLATE MFG. COMPANY, whose works are located at Fortieth street and Wentworth avenue, Chicago, have opened a city office at Room 583, The Rookery. All purchases of material and sales of product will in future be made from the city office. The company have made steady progress since their establishment in June of last year. They report their Tin and Terne Plate, which are made by the palm oil process, are giving so much satisfaction that they cannot meet the demand and are therefore arranging to at once put in additional cleaning and tinning machines.

TRAVERS BROS. COMPANY of New York have opened warehouse and offices at 224 and 226 Randolph street, Chicago, for the convenience of their Western trade. The company advise us that they are now manufacturing all kinds of Sash Cord, Twines, &c., and state that they are in a position to furnish everything in this line that the trade may require, it being their intention to supply the trade direct. They call special attention to their Peerless brand of pure Manila and Sisal Rope and Binder Twine.

AMONG THE ADVERTISEMENTS in this issue is one directing attention to Ayers' Combined Hand Planter and Hoe, which is being put on the market by J. R. Ayers, Petersburg, Va. An illustration of this implement is given, together with an enumeration of some of the points connected with its use.

HAINES & ZIMMERMAN, 407 Cherry street, Philadelphia, are putting on the market a Single Stroke Bicycle Bell, which they are selling to retailers at \$2 per dozen. The Bell is described as well finished, strong and nickel plated. They have also entered the market with a line of Steel Key Blanks, and will have a line of Tinned Malleable Blanks on the market very shortly.

R. CHRISTENSEN, 88 Chambers street, New York, whose removal we recently mentioned, is now in possession of his new and much enlarged quarters. Having ample facilities for carrying stock and a location in the center of the Hardware district, he is desirous of representing in New York and the surrounding territory manufacturers of other Hardware articles on salary or commission. His announcement in regard to this will be found among the Special Notices.

GEORGE W. CORBIN, secretary of the Corbin Cabinet Lock Company, New Britain, Conn., was elected mayor of that city April 9. Mr. Corbin is a nephew of Peter and Andrew Corbin of P. & F. Corbin, New Britain.

HOLMES, BOOTH & HAYDENS, manufacturers of Brass and Copper Goods, Lamps and kindred articles, have moved from 25 Park place to No. 37 of the same street. They have the street floor and two basements. The main floor will be utilized for showing samples of Lamps and general office purposes. The head offices of the company are now at Waterbury, Conn., where the factories and rolling mills are.

Pushing Spring and Summer Goods.

BY OPENINGS.

IN PUTTING carried over stock in salable condition bring out all seasonable goods, look them over carefully, clean off all last year's dust and try to make them look like new goods. If you succeed, put them with the new goods. If they are shop worn put a price on some in plain figures that will sound low. You are sure to have some customers that will want just that article. Don't mark the price so high that the goods will not sell. It doesn't pay to hold over shop worn goods. Better have the cash to buy new goods with. I have noticed that credit customers will pay cash for shop worn goods that are marked low.

TIME FOR PURCHASING.

A memorandum of all seasonable goods that you think you will want for the spring and summer trade should be made out, then you are ready for the traveling men. When they come get lowest prices, and on goods that you know there is only one price, such as some makes of oil stoves, &c., buy early so as to get all of the extra discounts. By the last of March you will know the lowest prices at which spring and summer goods can be bought, and then is the time to buy, as prices are likely to advance. If you wait until you are about to sell the goods the prospects are that you cannot get the quantity you want at once and delays are dangerous to your trade, as you are obliged to have the goods when your customers call for them.

IN PREPARING ROOM

for seasonable goods, clean out the front of your store and put away all winter goods. Get out spring goods by April 1, have a spring opening and have on exhibition all of the season goods. People buy earlier than they used to and you will find customers calling for oil stoves, window and door screens in April; be prepared for them. Have these goods where they can be seen so that an every day customer, when ready to buy, won't forget where he saw a full line of these goods.

ARRANGE

all small, seasonable goods on a counter, putting them in wire dish drainers, and mark prices in plain figures; change them around often, bringing the new goods to the front. Be sure and change goods in your windows weekly. Have a certain day to do it and see that it is done before you go home at night; do not neglect the windows. Lots of people go by your windows every day who never read an advertisement, but if the window display is changed often they are sure to get in the habit of stopping and looking in. Your windows are your best advertisement, as when people are attracted by your window they are coming into your store.

CHANGE YOUR ADVERTISEMENT

with each issue of the newspaper and advertise what people are needing. Increase your trade by having spring and summer openings. Now, laugh! but it pays to have these openings. It gets people into your store and they go home and talk over what they saw; it gives them something to talk about. Have your gasoline stove man come and show up his stove, also keep a stove running.

TO MAKE A STORE

more attractive in summer arrange the front part of it in an inviting manner; put as many of your seasonable goods in the front part of your store as possible, at least have samples in the front. Don't put them all in a heap; have the screen doors where they may be seen, not on the refrigerators; keep small goods off of the larger ones, moving them around often; attend to business and treat your customers politely, and understand the goods you are selling; make a memorandum of your last year's mistakes and don't make them over again, and your business will certainly increase.

H. D. Edwards & Co.'s Catalogue.

H. D. EDWARDS & CO., Detroit, Mich., have issued a handsome illustrated catalogue, $9\frac{1}{4} \times 11$ inches in size, containing 260 pages, substantially bound in cloth and leather. The catalogue is known as No. 30, and is devoted to Belting, Fire Hose, Cordage, Marine Hardware, Mill and Mining Supplies. The business was established in 1855, or 39 years ago, since which time the company have secured, one by one, the agencies in their territory for the leading manufacturers in each particular line. The company are manufacturers of the following specialties: Pure Oak Leather Belting, Rawhide and Tanned Lace Leather, Cut Rawhide and Tanned Lacing, Smith's Patent Belt Fasteners, Hartz Steel Tackle Blocks, Marine Hardware, Bostwick's Polar Metal and Fire Apparatus. The book is fully illustrated, with descriptions, printed on a good quality of paper, and is very complete in the line of goods handled by the company.

Price-Lists, Circulars, &c.

J. H. STERNBERGH & SON, Reading, Pa.: Catalogue of Machine Bolts, Blank, Bridge and Roof and Hanger Bolts, Bolt Ends, Coach and Lag Screws, Drive Screws, Pole Steps, Carriage, Plow and Stud Bolts, Set and Cap Screws, Track Bolts, Belt and Elevator Balls, Boiler and Patch Bolts, Stay Bolts, Boiler and Ship Rivets, Nuts and Washers, Turnbuckles, Pipe Sleeve Nuts, Hook Head Bolts, Special Bolts, and Iron Work for buildings and bridges. A Lag Screw, with a washer forged on it, is shown as a novelty. Another novelty is a Soft Steel Track Bolt, with the threads raised above the body of the Bolt by cold pressure under a new process. It is explained that the firm manufacture in their own mills all the iron and steel consumed in their works, and that besides the goods they illustrate they are prepared to furnish estimates on all kinds of special goods. A photo engraved frontispiece gives a view of the works, and the closing

pages are devoted to useful tables of weights of standard goods.

J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass.: Fine Mechanical Tools. An illustrated catalogue and price-list contains Calipers, Dividers, Surface Gauges, Countersinks, &c. Attention is directed to Key Hole and Screw Calipers and Dividers with thumb attachment. The manufacturers state that they have enlarged their works and hereafter expect to be able to produce goods with such rapidity as to meet both their domestic and foreign orders promptly.

B. A. STEVENS, Toledo, Ohio: Butchers' Supplies, Machinery, &c. The catalogue of 238 pages not only contains illustrations, descriptions and prices of Butchers' Supplies, Machinery, &c., but also a large amount of general information.

STANLEY & PATTERSON, 32 and 34 Frankfort street, New York: Telephones. An illustrated circular and price-list shows Telephones requiring no battery, consisting of magneto signal bells, receivers and magneto transmitters, which, it is stated, will be free from all patent complications or question of infringement. Sets are furnished for short lines, also for 20-mile lines. Switchboards, Telephone Cords, Magneto and Extension Bells, &c., are also carried in stock.

THE KEYLESS LOCK COMPANY, 125 to 137 Rees street, Chicago: Catalogue of the Craig Anti-Dial Combination Locks. This catalogue illustrates and describes the Craig Rim Drawer or Locker Lock, the Craig Flush Knob Chest Lock, the Craig Rim Night Latch and the Craig Rim Store Door Lock. While these Locks are all keyless, they are operated without a dial and merely by the sense of feeling, thus enabling them to be opened in the dark as well as in the light. The catalogue gives full particulars of the principle on which these Locks are constructed, together with lists of public institutions which have purchased them in large quantities, also testimonials from numerous users.

WM. M. CRANE & Co., 838 Broadway, New York: Gas Appliances for hotels, restaurants, cafés, clubs and fine residences. Among the goods shown in their illustrated catalogue are Perfect, Perfection and Success Gas Ranges, Cake Griddles, Coffee Roasters, Iron Heaters for laundry work, Portable Ovens, Gridirons, Hotel Ranges, Hot Closets and Pastry Ovens, Gas and Steam Tables, Cookers, Urns for tea, coffee and water, Confectioners' Stoves, Ceramic Kilns, Ovens, Gas Logs, Water Backs for circulating hot water, and numerous other implements for household use in connection with gas.

MOSELEY & STODDARD MFG. COMPANY, Rutland, Vt.: Cheese and Butter Making Appliances. An illustrated catalogue and price-list shows Steam Turbine Separators, Box and Trunk Churns, Barrel Churn, tempering and receiving Vats, Butter Workers, Milk Testers, Milk Cans, Strainers, Milk Pumps, Stationary Boilers, Engines, Trucks, Butter Prints and packages, and miscellaneous goods.

E. T. BARNUM, Detroit, Mich.: Wire and Iron Goods. Catalogue No. 690, containing 119 pages, illustrates, with prices, Iron Settees and Chairs, Galvanized Flexible Settees and Chairs, Summer House, Trellises, Vases, Automatic Wire Gate, Flower Pot Stands, Cheese Safe, Wire Cloth, Wire Fencing, Grilles, Bank and Office Railings, Hitching Posts, Stable Fittings, Iron Stairways, Cresting, Vanes, Cemetery Fence, &c.

GILBERT & BENNETT MFG. COMPANY, 44 Cliff street, New York, and 148 Lake street, Chicago: Spring catalogue, 1894, No. 180. This is a catalogue and price-list of Netting, Wire Fencing, Wire Gates, Sand Screens, Wire Cloth, Metal Chairs and Settees, Window Guards, Counter and Desk Railing, Wire Arches, Wire Grave Guards, Feed Racks and other Wire Goods. The company's factories are at Georgetown, Conn., and Chicago, Ill.

MATTHAI, INGRAM & Co., Baltimore, Md.: "Old Time" Tinware. A noticeable feature throughout the catalogue is the mention of the grade of material used in the manufacture of each article. The ware is made under a registered trade-mark embodying the name "Old Time," and every piece is of extra heavy weight and guaranteed. The makers state that the weights and other excellent qualities of this line of Tinware will be honestly and strictly maintained. The goods include Coffee and Tea Pots, Coffee Boilers, Buckets, Saucepans, Farina Boilers, Farina Saucepans, Sauce Pots, Cook Pots, Oil Cans, Tea Steepers, Muffin Pans, Cups, Cake Turners, Dippers, Graters, Colanders, Bowls, Dish and Baking Pans, Mugs, Milk Kettles, Bread Raisers, Pails, Tea Kettles, and Wash Boilers. The catalogue contains 48 pages and is bound in embossed paper covers. Also a catalogue of new goods, supplementary to their Nos. 20 and 21 general catalogues, covering Mugs, Dippers, Ladles, Skimmers, Cake Turners, Gravy Strainers, Graters, Pie Plates, Jelly Pans, Tea and Coffee Pots, Coffee Boilers, Stove Kettles, Tea Kettles, Sap Pails, Oil Cans. The catalogue is to be known as No. 22, and contains 26 pages bound in neat paper cover.

THE AMERICAN SAW COMPANY, Trenton, N. J.: The catalogue relates to solid and inserted tooth Circular Saws, Shingle and Grooving Saws, Mulay, Gang and Mill Saws, Band Saws, Cross Cut Saws, Ice Saws, Swages, Mandrels, Gummars, Hand Screw Presses, Saw Makers' Anvils, Hammers, Wrenches, Speed Indicators, Gauges, Grinding Machines, &c.

It Is Reported—

Alabama.

That the Hardware firm of Luttrell & Fuller, BREWTON, has been succeeded by Luttrell, Fuller & Co. The only change made in the business was the admission to partnership of R. E. Mallett, who has for several years past been in the employ of J. Randolph Brown of Troy, and who is referred to as a Hardwareman of considerable ability and experience.

California.

That Z. C. Mathes has opened a new Hardware store in the Snyder Block, SAN DIEGO.

Florida.

That W. H. Parkin, formerly of Cleveland, Ohio, will soon open a new Hardware store at PALM BEACH, DADE COUNTY. Palm Beach is the terminus of the new Jacksonville, St. Augustine & Indian River Railroad. Mr. Parkin's store will be the only exclusive Hardware store at Palm Beach, which has grown largely during the last six months. He expects to conduct both a wholesale and retail business.

Illinois.

That Hopkins Bros., CENTRAL PARK, have purchased the Hardware and Tinware stock of H. E. Rebmann. Mr. Rebmann contemplates taking a trip to California.

That the Hardware stock of Wadsworth & Matheson, JACKSONVILLE, was

completely destroyed by fire on the 26th ult. The loss is estimated at \$30,000.

That S. F. Yeager & Son of PEARL CITY have disposed of their Hardware stock to John Klapp and A. M. Schotz.

That S. O. Stillman, GALENA, has been succeeded in the Hardware business by Stillman & Stahl.

Indiana.

That J. W. Miller has purchased an interest in the Hardware store of F. V. B. Minnich, GOSHEN. The style of the firm will hereafter be the Minnich Hardware & Furniture Company.

Iowa.

That W. H. Sedam is a new Hardwareman at STANWOOD.

That Kunz & Fay's Hardware store, BELLEVUE, was burglarized on the 26th ult. Thirty dollars' worth of goods were taken by the thieves.

That Liebig & Sons, KALONA, have sold their Hardware store to Lucas, Rust & Smith of KINROSS.

Kansas.

That the Woodbine Hardware Company's store, at WOODBINE, was destroyed by fire on the 29th ult.

Maine.

That F. T. Dana, WISCASSET, dealer in Hardware and Cutlery, has removed to a new location in that place.

Massachusetts.

That the Stove stock of Folger & Reagan, GLOUCESTER, was damaged by fire on the 5th inst.

That Thurston, Hale & Co. have recently entered the Hardware business at ROCKPORT.

Michigan.

That the dynamite storehouse of the Ferguson Hardware Company, SAULT STE. MARIE, blew up on the 31st ult. It contained 5000 pounds of the explosive. The explosion shook the entire town and broke many windows.

That D. Leach, MINDEN CITY, is now conducting the Hardware business formerly carried on by Geo. W. Thayer & Co.

That J. C. Cozad has succeeded A. B. Kleaber in the Hardware business at WAYNE.

That L. S. Dickinson's Hardware store at FENNVILLE was recently entered by thieves, who took away about \$60 worth of Knives, Razors and Revolvers.

Minnesota.

That H. A. Boyer of FOUNTAIN has purchased the Hardware and lumber business of John Johnson, and will take possession of it on May 1.

Missouri.

That the Hardware stock of H. A. Walcott, CARTHAGE, was damaged by fire to the extent of several thousand dollars on the 30th ult.

Nebraska.

That James A. Miller has sold out his Hardware business at FIRTH.

That William Weaver of Wakefield has purchased a Hardware stock at TILDEN, where he will engage in business.

That Frank Chain of EXETER has disposed of his interest in the Hardware firm of Chain & Williams to A. E. Benedict. The new firm will be known as Williams & Benedict.

New York.

That John Lilley's Hardware store at BAINBRIDGE was burned out on the 2d inst. The loss was fully covered by insurance.

That Murphy & McEligott's Hardware store at CLYDE was slightly damaged by fire on the 3d inst.

That Leonard Jones of Remsen has entered the Hardware and Tin business at HINCKLEY.

That Frank Hall, Hardware merchant of PRATTSBURGH, has sold out to Flynn & Walker.

That Peter J. Kimmel has bought a half interest in the Hardware business of M. Kimmel & Son of COHOCTON.

Pennsylvania.

That \$60 worth of Revolvers were secured by thieves from the Hardware store of James McCullough, KITTANNING, a short time since.

That J. H. Burroughs of ROGERSVILLE has purchased his partner's interest in the Hardware store and has taken entire control.

That J. J. Mackin and Charles Caffrey of ASHLEY have formed a partnership and opened a Hardware store in the Hopkins Block.

Rhode Island.

That Starr & Bailey have purchased the entire stock of goods of William G. Browning & Son, EAST GREENWICH. The stock includes Hardware, Farming Implements, Paints and Oils, Crockery, House Furnishing Goods, Furniture, &c. They will continue the business at the old stand.

Vermont.

That the Strong Hardware Company's store at BURLINGTON was burglarized on the 25th ult. Nearly all the Pocket Knives and nickel plated Scissors in stock were carried off by the thieves. The stolen booty is valued at \$300.

Wisconsin.

That the Hardware firm of Krause & Darling of SHEBOYGAN has been dissolved. It was the oldest firm in the city. Mr. Darling will hereafter make his home in St. Paul, Minn.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

White Lead.—Irregular prices and merely fair volume of business sums up about all that there is to report on the market for this pigment. Grinders are making few purchases of Dry Lead, for the sufficient reason that deliveries on old contracts supply their needs in a great measure, and jobbers being well stocked are purchasing only limited quantities of Lead in Oil. The jobbing distribution of the latter is, however, quite brisk. Prices are still weak and unsettled, with 4¢ @ 4½¢, as to size of lot, quoted for Dry Lead and 5¢ @ 5½¢ for Lead in Oil, less usual discounts. Small packages bring the customary premium.

Red Lead.—Few, if any, contracts for either domestic or foreign products have been placed during the past week, and the movement of ordinary lots out of store has hardly reached average proportions for the season. Prices incline slightly in buyers' favor, but have undergone no radical change.

Litharge.—The condition of the market remains practically the same as it was a week ago. The volume of business is no larger, the demand has improved in a slight degree only, and prices are rather unsettled. Low grades used by rubber and glass manufacturers are openly offered at 4¾¢, and it is stated that some sales have been made

at a lower rate. High grade sells in jobbing way at about former prices.

Orange Mineral.—Business has been slower the past week than it was during the preceding one and the demand seems to have fallen off also, leaving the market in a dull condition. Prices have undergone no important change, but are a shade weaker, particularly on some foreign brands.

Zincs.—Small orders for American Oxide have been more frequent and made up a fair volume of business, but large consumers continue to be well supplied from deliveries making on old contracts. The business that does take place is chiefly at old prices. German brands of dry Oxide sell fairly at about 5¢ for good sized lots, but there is hardly the average business in other foreign makes.

Colors.—Slightly better sales have been made of some lines of bulk colors for grinders' use, Umbers, Siennas, Ochres and Vermilion faring noticeably well. Not enough has been done, however, to have any decided effect upon values. Colors in Oil have met with quite good sale in a jobbing way, but are otherwise quiet. Ready Mixed Paints are in livelier demand, and the movement of the better sorts adapted to outside work is nearly or quite up to full average volume for the season.

Whiting, &c.—A good business has been done in commercial Whiting, but at rather low and irregular prices. Other varieties have met with merely routine sale. No change is visible in the market for Block Chalk; demand very slow.

Oils and Turpentine.

Linseed Oil.—No positive change in prices has taken place during the week under review, but the market has a somewhat uncertain appearance, with signs that more severe pressure of out of town brands in this and neighboring cities would likely lead to retaliation by local interests under which values would become very unsettled. For the present, however, city crushers quote 52¢ for Raw Oil made from American seed, with usual allowance for package. Out of town brands are still offered at 44¢ @ 50¢, and it is intimated that 48¢ would be accepted for a New York State brand, providing the buyer gives a large order. Business has been moderate during the week and chiefly of a jobbing nature.

Cotton Seed Oil.—Operations in Crude product have been on a rather smaller scale, and the speculative interest that figured conspicuously last week has moderated. In fact, speculation is almost at a standstill at the moment. However, enough business has been done to keep prices quite steady. Refined Oils have been moderately active, but prices show more or less irregularity, being affected by the erratic course of the Lard market, and some indication of anxiety on the part of speculators to unload. However, the changes in prices have been moderate, and closing figures differ but little from those that ruled a week ago.

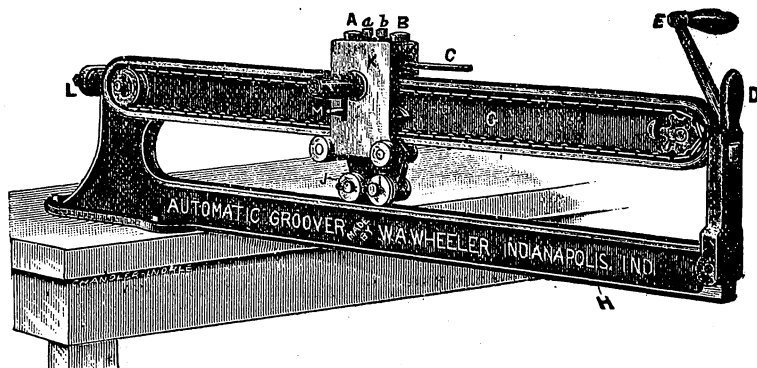
Lard Oil.—Irregularity in the market for Lard has unsettled prices for Oil, and also tended to check business. Still 1 cent per gallon will cover the extent of the fluctuation during the week, and the market suffers less in fact than in appearance. Popular brands of Prime Oil have not been sold at less than 62 cents, while 63 cents was obtained for moderate sized lots.

Fish Oils.—No movement in crude Sperm Oil has taken place as yet, and little interest in crude Whale or crude Menhaden is manifested. Hence prices are nominal in a great measure, and apparently above buyers' ideas of value. The sale of pressed and bleached products is fair, but chiefly of a jobbing nature, and at 'practically the

prices that have ruled for several weeks.

Miscellaneous.—Ceylon Coconut Oil has been selling rather more freely, and prices are now quite steady at

by simply removing a spring pin from the stud that carries them. The sprocket wheel, which drives the chain, is turned up true and the teeth milled out from



Wheeler's Automatic Groover.

55¢ @ 5¾¢ for spot goods. Cochín is also steadier at 6½¢ @ 6¾¢. Common Olive Oil is barely steady at 60¢ @ 62¢ and meets with only fair sale. There has been no change in Red Oils or in Neatsfoot Oil.

Spirits Turpentine.—Prices advanced during the early part of the week to 30¢ for regular and 30½¢ for machine barrels. Since then the market has been very steady, with business fair, and the arrivals only large enough to keep spot stocks in fair shape.

Wheeler's Automatic Groover.

The accompanying illustration represents an automatic groover offered by W. A. Wheeler, Indianapolis Elbow Company, Fort Wayne avenue and St. Clair street, Indianapolis, Ind. It is described as quite new in design, it being operated from the outer end, as indicated in the illustration. The point is made that the operator can thus handle the work and run the machine without stepping out of his tracks, thereby saving much time. The carriage or sliding head, containing the grooving and seaming down rolls I and J, is brought forward over the work by means of a device, consisting of a chain and sprocket wheel attached to the crank A latch, M, pivoted within the sliding head, makes the connection with the chain and brings the head forward when the crank is turned. When the carriage has reached the end of its travel a projecting lug seen near the sprocket wheel strikes the beveled end of the latch, tilting it upward, thus freeing it from the chain and causing it to stop automatically. At the same time and just before the carriage comes to a stop, the pusher rod C strikes the top end of the clamp D, and throws it over simultaneously with the stopping of the carriage. The operator now takes hold of the handle on the side of the carriage with the left hand, and with one finger holding up the latch M, quickly shoots the carriage back to the starting point without moving the crank, thus releasing the work. The latch M is now ready to engage the chain again, which it does when the crank is turned. The automatic groover is designed to groove and roll down at one operation the seams on any kind of tin or sheet iron work, from the lightest tin to sheet iron as heavy as No. 24 gauge. It will groove pipe, it is stated, from 2½ inches diameter and upward 30 inches long. Suitable rolls are furnished with each machine for the different kinds of work, and they can be quickly changed

the solid. Ample provision is made for adjustment and taking up of wear or lost motion.

The McKim All Metal Measure.

The accompanying cuts illustrate the McKim metal bottom ¼-bushel measure being put on the market by the Bellaire Stamping Company, Harvey, Ill. Fig. 1 is a general view of the measure, while Fig. 2 shows it with side wall cut away, revealing the top finish and the method of joining on the bottom. Special emphasis is laid upon



Fig. 1.—The McKim All Metal Measure.

the fact that it is made of solid steel, the bottom being fastened mechanically in a slot. The slot is formed in an ingenious manner by a series of folds in the bottom of the measure, which can be clearly seen in Fig. 2. The bottom is further strengthened by a metal foot riveted to the center of the bottom

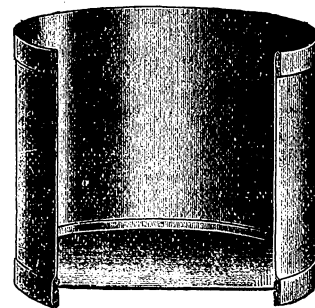


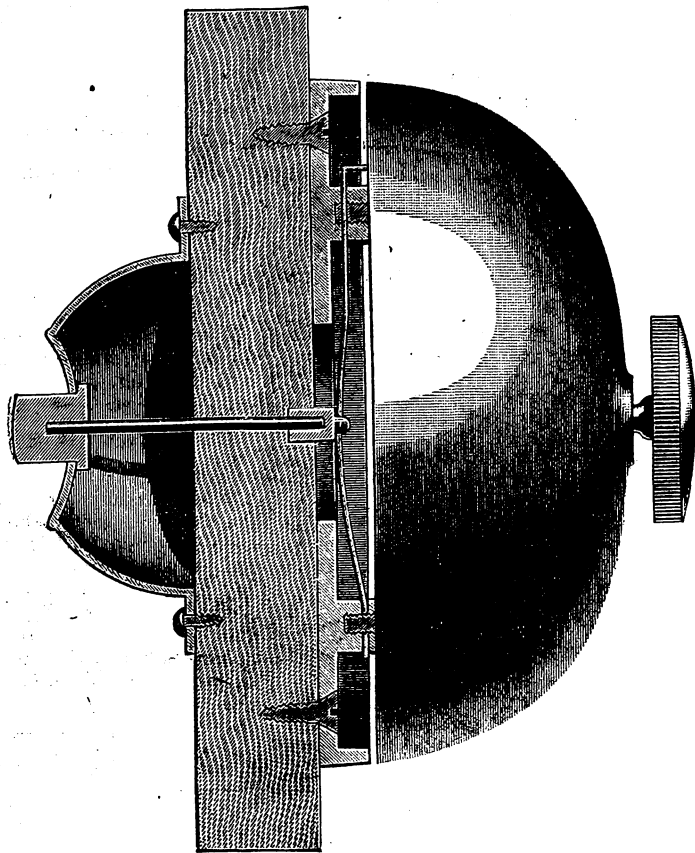
Fig. 2.—Measure with Side Broken Away.

plate, to prevent the bottom springing down, however great the pressure upon it. The measures are made of a heavy gauge of metal and are thoroughly painted.

Standard Vibrator Push Button Door Bell.

The accompanying illustration represents a push button door bell being introduced by Manning, Bowman & Co., Meriden, Conn., and 57 Beekman street, New York. The clock work inside the gong is wound by means of the thumb nut at the left of the cut. Pushing the

wide and 12 inches high, made of quarter sawed oak, highly polished with hard oil. A special feature claimed by the manufacturers for the case is that it cannot be opened from the outside, and that to open the case the combination to the money drawer must be known. The money drawer or alarm till has a sliding tray with six hoppers and one compartment for paper money.



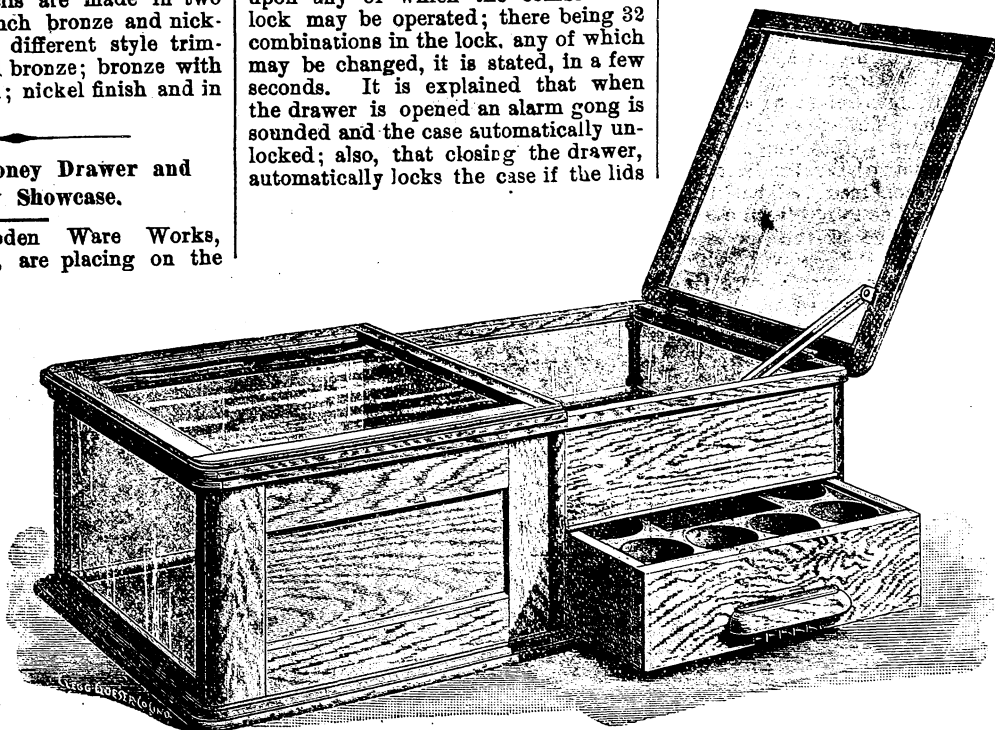
Standard Vibrator Push Button Door Bell.

button releases the mechanism, causing about 250 rings for each winding. The bells are adapted for use on doors or casings. The bells are made in two sizes—3½ and 4 inch bronze and nick-eled gongs, with different style trimmings in natural bronze; bronze with black background; nickel finish and in old copper finish.

Combined Money Drawer and Cutlery Showcase.

Waddel Wooden Ware Works, Greenfield, Ohio, are placing on the

Beneath the tray are five compartments for paper money, bills, &c. Five finger keys are located under the drawer pull, upon any of which the combination lock may be operated; there being 32 combinations in the lock, any of which may be changed, it is stated, in a few seconds. It is explained that when the drawer is opened an alarm gong is sounded and the case automatically unlocked; also, that closing the drawer, automatically locks the case if the lids



Combined Money Drawer and Cutlery Showcase.

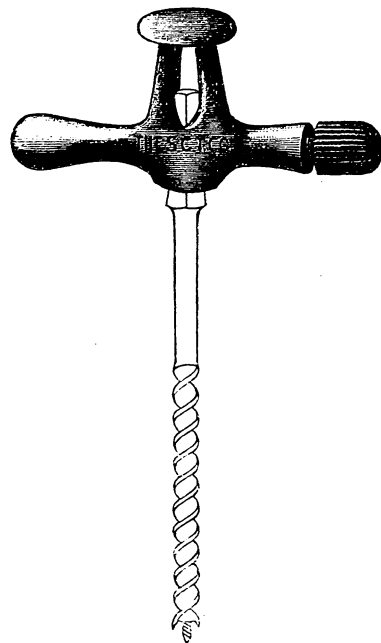
market a combined money drawer and cutlery showcase, as shown herewith. The case is 38 inches long, 24 inches

are closed. The manufacturers claim that the case prevents familiar customers from handling cutlery when the mer-

chant and his employees are busy, and that it is an absolute safeguard against the theft of cutlery during business hours. The point is made that the addition of an extra money drawer would be of great convenience to many merchants.

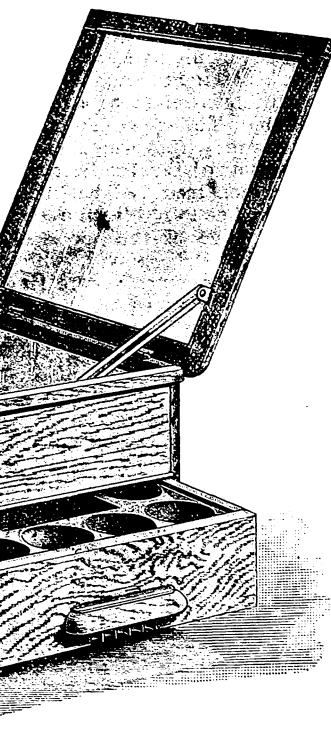
New Adjustable Bit Wrench.

The Samuel C. Tatum Company, Cincinnati, Ohio, are offering an adjustable bit wrench as here shown. The tool is particularly designed for use where there is scant space to turn a brace, and it is made to fit any style of brace bit shank. The button head protects the



New Adjustable Bit Wrench.

hand from the sharp corners of the bit shank, which, it is remarked, is an improvement over the usual form of tools



for this purpose. The manufacturers recommend it especially for the use of electricians and bell hangers.

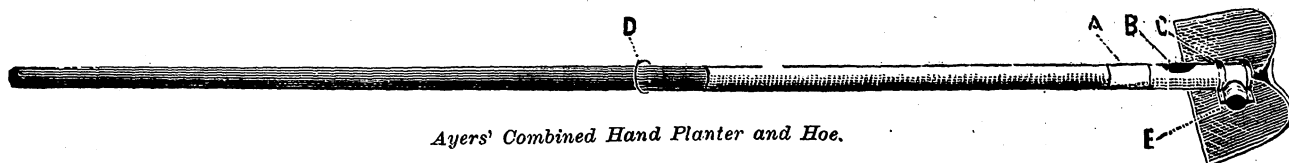
Ayers' Combined Hand Planter and Hoe.

J. R. Ayers, Petersburg, Va., is introducing the combined hand planter and hoe shown herewith. The upper

Set of U. S. Auger Bits in Canvas Roll.

Sargent & Co., New York, are putting up auger bits in sets in canvas rolls, as shown in the accompanying

bits or to the other tools with which it may come in contact. The point is made that it provides a convenient method for keeping the bits safe from injury and a handy way for the mechanic to carry them wherever needed.



Ayers' Combined Hand Planter and Hoe.

part of the handle is of wood, while the lower part, to which the blade of the hoe is attached by the malleable

cuts. The bits are No. 488, Jennings' pattern, extension lip, 32 $\frac{1}{2}$ quarters, 13 bits—one each $\frac{1}{16}$ to $\frac{1}{8}$, inclusive.

The price for the bits in the roll is the same as has heretofore been charged for bits in boxes, while the manufacturers

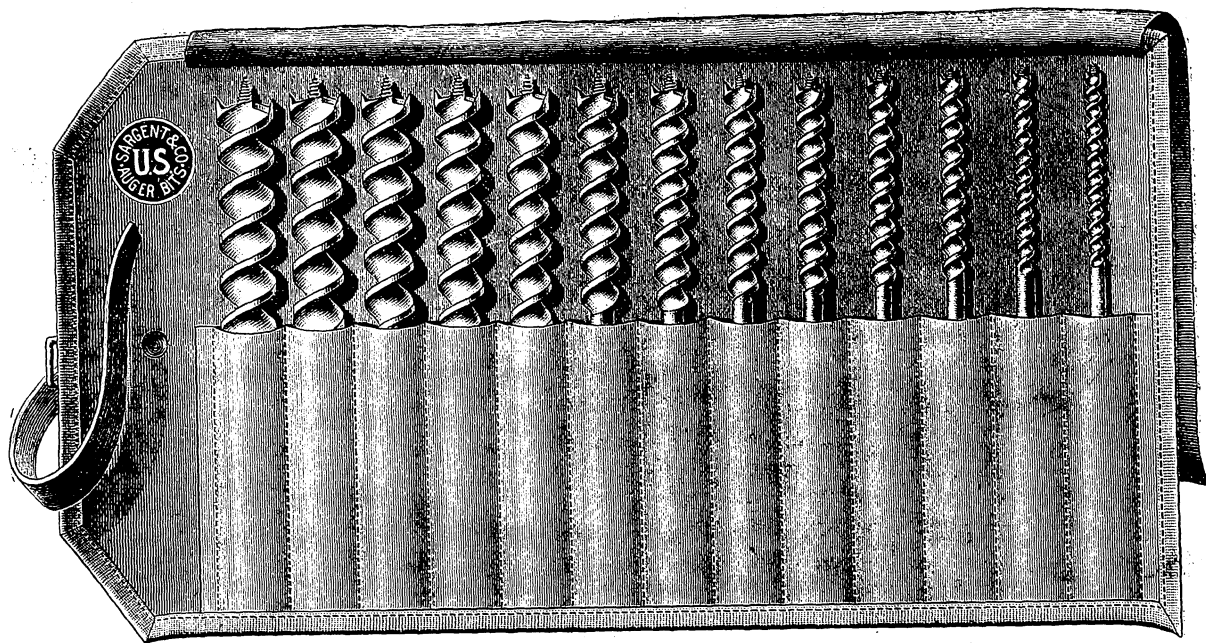


Fig. 1.—Set of U. S. Auger Bits in Canvas Roll.

clamp and shank C, consists of a hollow metallic tube, holding about a quart of corn. The corn is put in the tube at the opening B, which is then closed by the ferrule A being slipped over the opening. The nozzle E, from which the grain is discharged, is kept closed when not in use by a seed slide, connected to a steel rod running through the tube, and is controlled by a spring within the tube. The upper end of the rod terminates in a ring which encircles the wood part of the handle at D. In use, after each seed bed has been prepared by the hoe to receive the seed, the right hand edge of the hoe is allowed to strike the ground, which brings the nozzle down, the wire ring D is pressed and the seed is dropped from the nozzle E, an instant only being required for the operation. The point is made that when horse planted fields need replanting in part, owing to poor seed or to the ravages of birds and insects, the planter can be used to advantage; for as a hoe it is always ready to loosen the earth, preparing the seed bed and dropping the seed; or it may serve for ordinary hoe work as the operator passes along where no planting is needed. The manufacturer claims that the device works equally as well with beans and peas; that it is thoroughly well made, of agreeable weight, and not liable to get out of order.

These are put up in a roll, as shown in Fig. 1, made of dark colored pliable canvas cloth, nicely lined with blue canton flannel and secured with a strap and patent buckle. A receptacle is

claim that the roll is more convenient and takes up less room than a box.

New Model Crane Smoker.

A. I. Root, Medina, Ohio, has improved the Crane smoker, for 1894, as shown in the accompanying cut. The tin fire cup is now surrounded by as-

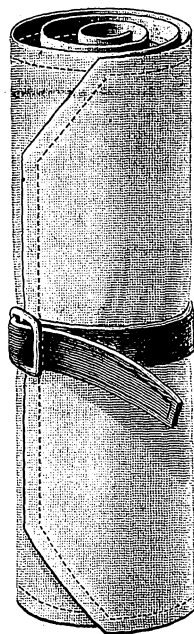
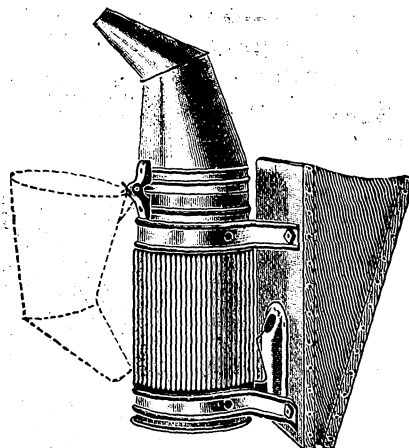


Fig. 2.—Auger Bit Roll Closed.

provided for each bit, keeping them free from injury. The case rolled up with the bits, as in Fig. 2, measures 3 x 11 inches, and may be thrown into the kit of tools without injury to the



New Model Crane Smoker.

bestos sheeting, over which is a corrugated shell, as shown in the cut. The cup is secured to the bellows board by four small bolts instead of screws. Instead of leather for the bellows a very heavy grade of rubber cloth is used, which, it is stated, is not only more pliable, but

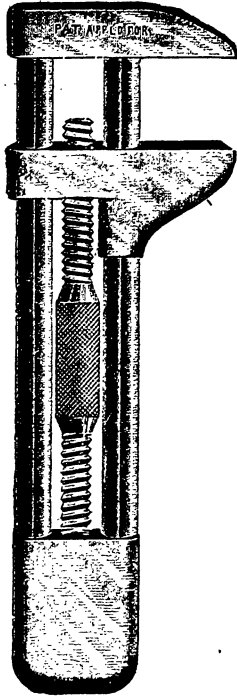
The Lehigh Valley Transportation Company's new dock shed, at Superior, Wis., will cost, it is stated, over \$200,000. It will be of iron throughout.

more nearly air tight. Attention is called to the check valve, a device for forcing the air through the cup, even when crammed with fuel, and at the same time designed to prevent the smoke from going into the bellows. The top is secured by a malleable iron hinge, accurately milled at the joint, it is stated, so that the top will fly squarely in place. The point is made that the hinge obviates burning the fingers and losing the top. The smokers are packed one each in a telescopic paste-board box.

Jackson Colonial Latch Lock.

The accompanying cut represents a bronze latch lock manufactured by the Miller Lock Company, Philadelphia, Pa. The length of the latch from the screw to the edge of the door is 3 inches. It requires a 1-inch hole for the cylinder in putting it on, and no other cutting of the door. It is operated by a flat key from the outside and by a lift from the inside of the door. The lock is referred to as being secure, and as sold at a price that makes it available for use by the masses, affording for a small house as much security and as handsome trim—when the escutcheon is used—as can be obtained from the more expensive latch used on the mansion. The latches are made adapted to wood $\frac{7}{8}$, $1\frac{1}{4}$ and $1\frac{1}{2}$ inches thick, having brass nosing and bronze latch, and provided with three plated steel keys. Escutcheons are furnished in fancy bronze, also in plated bronze. The manufacturers state that the latch is available for all house,

tion with less desirable makes. While but one size is now being made, that for



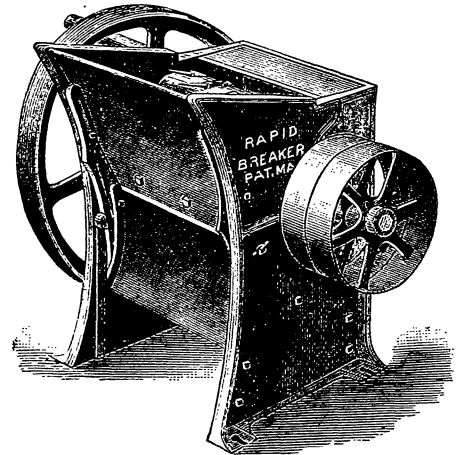
The Quick Wrench.

bicyclists, the manufacturers state that later they will make it in all sizes.

Improved Rapid Ice Breaker.

The accompanying illustration shows the improved Rapid ice breaker which

through the cylinder section and is locked by a lock washer, which makes it perfectly rigid. The teeth can be readily taken out when worn or broken and a new tooth inserted, removal of the lock washer being all that is necessary. The makers claim, as the cylinder of the

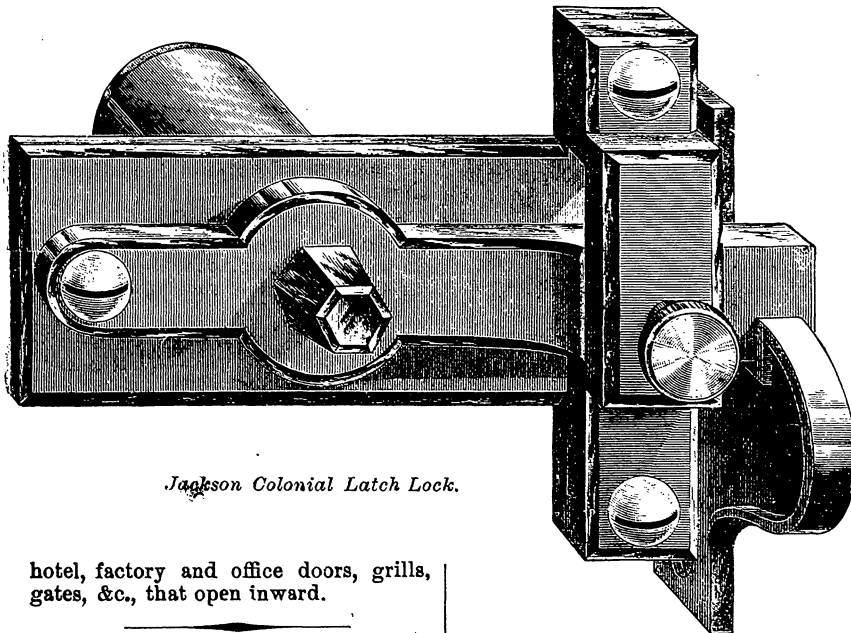


Improved Rapid Ice Breaker.

breaker is in sections, that when one section becomes damaged by unfair use the faulty section may be easily and quickly replaced; and that as the teeth are readily removed any repairs likely to be required can be made without loss of time.

Maine Creamery Can.

Portland Tinware Company, Portland, Maine, are offering the creamery can shown here. It is referred to as being made of the best quality of tin, extra heavy, well made, and is provided with a glass gauge and metal faucet. The faucet is set 1 inch from the bottom, to allow the milk to be drawn off until the cream is reached, then to draw off the cream, leaving an inch of milk in the bottom of the can with the sediment



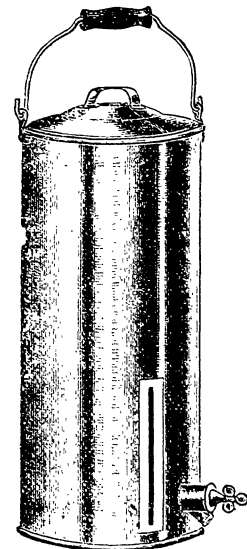
Jackson Colonial Latch Lock.

hotel, factory and office doors, grills, gates, &c., that open inward.

The Quick Wrench.

Hardy & Carter, 42 Oliver street, Boston, are putting on the market the wrench shown herewith. The name Quick has been given the wrench because of the speedy action imparted by the right and left hand double thread. The makers claim that the process of manufacture combined with the material used makes a practically indestructible article; that it is light, weighing 6 ounces, with a length of less than 5 inches; that its size, shape and general make up recommend it as a convenient wrench for the bicyclist to carry in the pocket or tool bag, and that its price brings it into fair competi-

Clement & Dunbar, 1129 Beach street, Philadelphia, are putting on the market. It is described as possessing many features not found in their last season's style. It is heavier in construction, being made entirely of iron, and the hopper is lower. It has a stouter driving shaft, with loose and tight pulleys for power; a solid iron back plate, reversible, so as to suit the location of the breaker, and a sectional cylinder supplied with adjustable teeth made from best tool steel, $\frac{1}{4}$ inch square. Each tooth is fastened to the cylinder section by a clamp and hook bolt, a groove in the tooth holding the bolt and preventing lateral motion; the bolt passes



Maine Creamery Can.

undisturbed. The can has been put on the market to take the place of a high priced can.

New Vibrator Turn Door Bell.

Manning, Bowman & Co., Meriden, Conn., and 57 Beekman street, New York, are offering the door bell shown in Fig. 1. The interior mechanism of

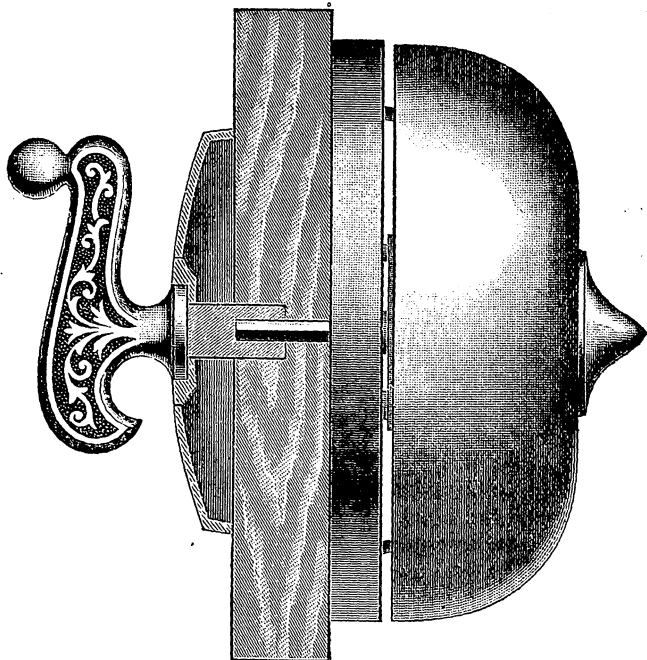


Fig. 1.—New Vibrator Turn Door Bell.

the bell is shown in Fig. 2, and consists of three cog wheels, without springs, which by turning the crank throw the sliding arm rapidly forward and backward, each end striking against the gong. A half turn in either direction makes 32 clear full electrical tones,

cuts. The filter is of cast brass, nickel plated, the body being 3 inches long and 3 inches in diameter, and designed to attach directly to the faucet of the water supply pipe. From Fig. 2 it will be seen that the connection with the faucet is made at the elbow, at the

left of the cut. To the right of the stop cock is a carbon block, $\frac{7}{8}$ inch thick, which fits the inside walls of the filter closely. This is held closely against the rubber gasket on the flange, by a set screw pressing against a brass spider. Access to the interior of the

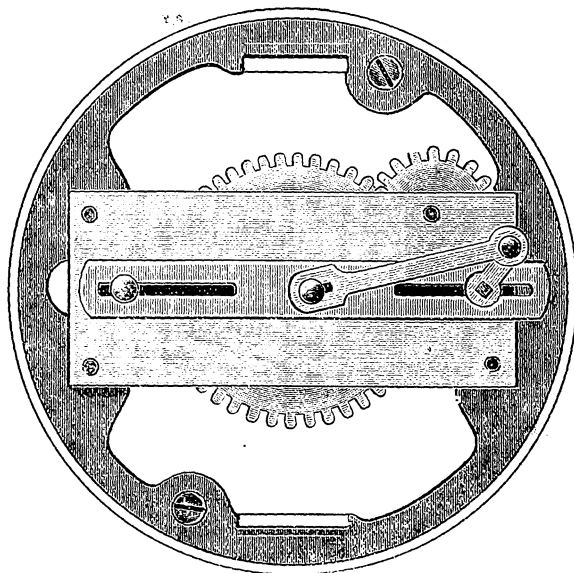


Fig. 2.—Inside View of New Vibrator Bell.

which may be heard throughout the house. The gong is $3\frac{1}{4}$ inches in diameter, fitted with turns and plates of different styles in natural bronze and in nickel finishes.

Hanks' Water Filter.

Bigelow & Dowse Company, Boston, Mass., as exclusive agents for the Hanks Filter Company, are introducing the filter shown in the accompanying

filter is gained by unscrewing the cap which forms the covering of the right hand end. The position of the carbon, it is explained, is such that it is kept clean by the water rushing in when the stop cock is raised, the water and dirt thus leaving the filter by the tube immediately beneath the stop cock. To filter the water the stop cock remains closed, and the water is forced through the carbon and out of the other tube. Should the pressure be insufficient to keep the carbon washed clean, it may be removed and the surface cleaned with

sand paper. The advantage claimed for the filter is that the filtering surface is

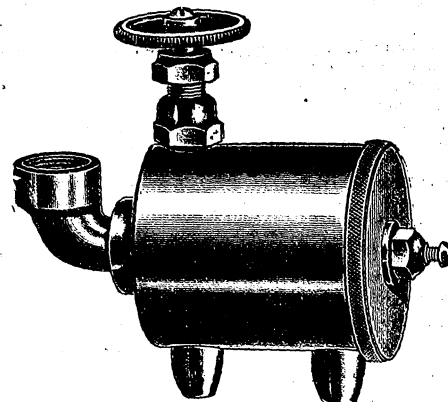


Fig. 1.—Hanks' Water Filter.

easily kept clean, consequently the water is not forced through accumu-

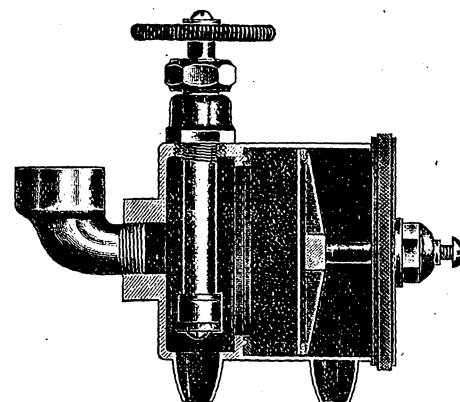
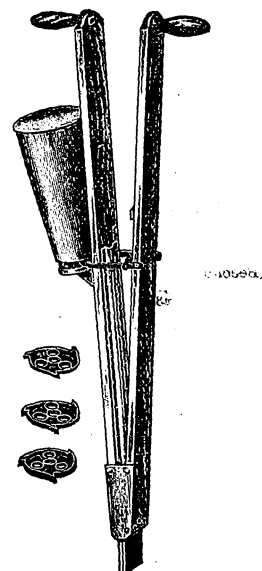


Fig. 2.—Interior of Hanks' Water Filter.

lated filth collected on the filtering surface.

Eclipse Hand Corn Planter.

The hand corn planter herewith illustrated is offered by F. E. Kohler



Eclipse Hand Corn Planter.

& Co., Canton, Ohio. It is provided with two pawls to operate the disk, one drawing the disk around as the handles are pulled apart, and the other pawl pushing the disk as the handles are pushed together. A spiral spring connects the two pawls to keep them in position. The planter has a positive feed and four changes of disks. The planter is referred to as extremely simple and as working easily.

Current Hardware Prices.

APRIL 11, 1894.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

The character @ is used to indicate a range of price thus discount 50&10@50&10&5 signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic.....\$3.00, 38¢@39¢&10¢
Excellior.....\$3.00, 38¢@39¢&10¢
North's.....\$3.00, 38¢@39¢&10¢
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

American—

Eagle Anvil, # 20.....15@15.25
Horse shoe brand, Wrought.....11@11.50
Moore & Barnes Mfg. Co.....39¢

Imported—

Armitage Mouse Hole.....10¢@11¢
S. & H., machine finished.....10¢@11¢
Trenton.....10¢@11¢
Wilkinson's.....10¢@11¢
Peter Wright's.....11¢@11.50

Anvil Vise and Drill—

Allen Anvil and Vise \$3.00.....40&10¢
Cheney Anvil and Vise.....25¢
Millers Falls Co., \$18.00.....20¢
Star.....45&5¢

Apple Parers—See Parers Apple, &c.

Augers and Bits—

Boring Machine Augers.....70@70&10¢
Car Bits, 12-in. twist.....50¢
Common Augers and Bits.....70@70&10¢
Cincinnati Bell-Hangers Bits.....50&10¢
Forstner Pat. Auger Bits.....15¢
Jennings' Pattern Car Bits.....40¢
Jennings' Pattern Auger Bits.....60¢
O. E. Jennings & Co., No. 10, extension
lip.....40¢
O. E. Jennings & Co., No. 30.....60¢
O. E. Jennings & Co., Auger Bits, # set
32½ quarters, No. 8, 35; No. 30, \$3.50, 25¢
Russell Jennings' Augers and Bits.....25&10¢
Lewis' Patent Single twist.....45¢
L'Hommedieu Car Bits.....15&10¢
Fugh's Black.....20¢
Fugh's Jennings Pattern.....30¢
Snell's Bits.....60&10¢@60&10¢

Bit Stock Drills—

Cleveland.....50&10&5¢
Cincinnati, for wood.....30&10¢
Cincinnati, for metal.....45&10¢
Crown Twist Drills.....50&10&5¢
Morose Process Twist Drill Co.....60&10&5¢
Standard.....50&10&5¢
Syracuse, for wood (wood list).....30&30&5¢
Syracuse, for wood (wood list).....30&30&5¢

Expansive Bits—

Clark's small, #18; large, #26, 35¢@35&10¢
Ives' No. 4, #20, 35¢@35&10¢
Steer's, No. 1, #26; No. 2, #18, 35¢@40¢
Stearns' No. 2, #26.....20¢
Swan's.....40¢

Gimlet Bits—

Bee.....25¢@25&5¢
Common.....\$ gross \$2.75@3.25
Diamond.....\$ doz \$1.25.....40&10¢
Double Cut:
Cl. Valley Mfg. Co.....30&10¢
Hartwell's.....\$ gro., \$10.00@40&10¢
Douglass.....40&10¢
Ives.....60&10¢
Shepardson's.....45¢@45&10¢

Hollow Augers—

Bonney's Adjustable, #20 \$4.80.....50¢
Cincinnati Adjustable.....25&10¢
Cincinnati Standard.....25&10¢
Douglass.....53¢@53&10¢
French, Swift & Co. (Beecher).....33¢@33&10¢
Ives.....33¢@33&10¢
Ives' Expansive, each \$4.50.....50&5¢
Stearns.....20&10¢
Universal Expansive, each \$4.50.....20¢
Wood's.....25¢@25&10¢

Ship Augers and Bits—

L'Hommedieu's.....15&10¢@15&10&5¢
Snell's.....25¢@25&10¢
Snell's Ship Auger Pat'n Car Bits.....15&10¢@15&10&5¢
Watrous'.....25¢@25&10¢

Awl Hafts—See Hafts, Awl.

Awls—

Brad, Handled.....\$ gr. \$2.50@3.00
Brad, Shouldered.....\$ gr. \$1.30@1.40
Peg, Pat.....\$ gr. 35¢@38¢
Peg, Should.....\$ gr. \$1.50@1.55
Scratch, Handled.....\$ gr. \$4.00@4.50
Scratch, Socket.....\$ doz. \$1.10@1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes

First quality, best brands.....\$6.00@8.50
First quality, rough brands.....5.50@6.00
Beveled and 50¢ doz.

Axle Grease—See Grease, Axle.

Axles—

No. 1.....3¼¢@4¢; 4¼¢@5¢
Nos. 7 to 14.....70¢
Nos. 15 to 25.....47¢
Nos. 19 to 25.....47¢
Concord Axles, loose collar.....3¢ cash
Concord Axles, solid collar.....4¼¢@5¢
5¢@6¢

Bag Holders—See Holders, Bag.

Balances—

Caldwell, low list.....30¢
Fullman.....60¢

Spring—

Spring Balances.....40¢@40&10¢
No. 2000 20 80
Chatillon, # doz.....\$0.80 0.95 1.75 net
Chatillon Straight Balances.....40¢@40&10¢
Chatillon Circular Balances.....50&10¢

Barb Wire—See Wire, Barb.

Bars—

Crow—
Cast Steel.....\$ d 3¼¢@3½¢
Iron, Steel Points.....\$ d 2¼¢@3¢

Basins, Wash—

Standard Fiberglass, No. 1, 10½ in., \$1.80;
12-inch, \$2.00; 13½-inch, \$2.50; 15-inch,
\$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82.....60&10¢
Chatillon's No. 1.....50&10¢@50&10&5¢
Chatillon's No. 2.....50&10¢@50&10&5¢
Custer's.....39¢

Beaters—

Egg—
Bryant's.....\$ gross \$14.00
Double (H. & R. Mfg. Co.), # gro., No. 0
\$12.00; No. 1, \$15.00; No. 2.....\$36.00
Dover.....\$ doz \$1.00@1.20
Dover (Standard Co.).....\$ doz \$1.00
Duplex (Standard Co.).....\$ doz \$1.00
Duplex Extra Heavy (Standard Co.).....\$ doz \$3.50
Easy (H. & R. Mfg. Co.).....\$ gro \$12.00
Improved Acme (H. & R. Mfg. Co.).....\$ gro \$9.00
Silver & Co.....\$ doz \$5.50
Spiral.....\$ gro \$4.25 @ \$4.50
Triple (H. & R. Mfg. Co.).....\$ gro \$15.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;
No. 2, \$2.....20¢

Bells—

Cow—
Common Wrought.....60&10¢
Kentucky Durham.....70&10¢
Kentucky, Sargent's list.....70&10¢
Kentucky, "Star".....70&10¢
Texas Star.....50&10¢@50&10&5¢
Western, Sargent's list.....70&10¢

Door—

Crane Brooks.....50&10&5¢
Crane Cone's.....10¢
Crane Connel's.....20&10¢
Gong, Abbe's.....39¢@40¢
Gong, Barton's.....40&10¢@50¢
Gong, Yankee.....45&10¢
Lever, R. & R. Mfg. Co.'s.....60&10¢
Lever, Sargent's.....50&10&5¢
Lever, Taylor's Bronzed or Plated.....net
Lever, Taylor's Japanned.....25&10¢
Pull, Brooks's.....50&10&5¢

Electric—

Bigelow & Dowse.....20¢@20&10¢
Wollensaks.....20¢@20&10¢

Hand—

Extra Heavy Brass.....70¢
Light Brass.....70&10¢@70&10&5¢
Silver Chime.....39¢@40¢
White.....70¢
Globe Cone's Patent.....25&10¢@35¢

Miscellaneous—

Call.....45¢@50¢
Farm Bells.....\$ d 35¢@38¢
Steel Alloy Church and School Bells.....40¢

Bellows—

Blacksmiths'.....60&10¢@50&10&5¢
Hand Bellows.....40&10¢@50¢
Molders'.....40&10¢@50¢

Belting, Rubber—

Common Standard.....75¢@75&10¢
Extra.....60&10¢@60&10&5¢
Standard.....70¢@70&10¢
N.Y.B. & P. Co., Carbon.....80¢@80&10¢
N.Y.B. & P. Co., Diamond.....50¢@50&5¢
N.Y.B. & P. Co., Para.....40¢@40&5¢

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....15¢
Green River Tire Benders and Upsetters.....20¢
Stoddard's Lightning Tire Upsetters.....15¢

Bits—

Auger, Gimlet, Bit Stock Drills, &c.,
see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron. 50&10¢@80¢
Moore's Novelty, Mal. Iron.....50¢
Sure Grip Steel Tackle Blocks.....25¢
See also Machines, Hoisting.

Boils—

Carriage, Machine, &c.—

Com. list June 10, '84.....80&10¢@80&10&5¢
Genuine Eagle, Norway, list Oct. '84.....80&5¢@80&10¢
Eagle, Norway, list Oct. '84.....80&10¢@80&10&5¢
Phila. pattern, list Oct. 7, '84.....80¢
R.B. & W., old list.....70¢
Bolt Ends, list Jan. 1, 1890.....80&10¢@80&20¢
Machine, list Jan. 1, 1890.....80&10¢@80&20¢

Door and Shutter—

Cast Iron Barrel, Square, &c.....75&10¢
Cast Iron Chain (Sargent's list).....65&10¢@65&10&5¢
Cast Iron Shutter Bolts.....75&10¢
Ives' Patent Door Bolts.....80&10¢@80&10&5¢
Wrought Barrel.....75¢@75&5¢
Wrt B. K. Flush, Common.....65&10¢
Wrt Shutter, Brass Knob.....50&10¢@50&10&5¢
Wrt Shutter, Sargent's list.....80&10¢
Wrt Shutter, all iron, Stanley's.....60&10¢@60&10&5¢
Wrought Square.....75¢@75&5¢
Wrt Sunk Flush, Sargent's list.....80&10¢
Wrt Sunk Flush, Stanley's list.....50&10¢@50&10&5¢

Stove and Plow—

Plow.....60&10¢@60&10&5¢
Stove.....65¢@70¢
R. B. & W., Plow.....55¢

Tire—

Common, list Feb. 28, '83.....70¢@70&10¢
American Screw Company.....75¢
Norway, Phila., list Oct. 16, '84.....80¢
Eagle, Phila., list Feb. 28, '83.....70¢
Port Chester Bolt and Nut Company:
Empire list Feb. 28, '83.....70¢
Keystone, Philadel., list Oct. '84.....80¢
Norway, Phila., list Oct. '84.....75¢
R. B. & W., Philadel., list Oct. 16, '84.....80¢

Bores, Tap—

Common and Ring.....20&10¢
Clark's.....38¢@38&5¢
Enterprise Mfg. Co.....25¢
Ives' Tap Bore.....39¢@39&5¢

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon—

Per b.....24¢

Boxes, Miter.

Spilker's E. Excelior, 3 in. \$7.50, 4 in.
\$8.50, 5 in. \$13.00, 6 in. \$15.00.....20¢

Braces—

American Bit Brace and Tool Co.....60&10¢
Nos. 10, 12, 20.....70&10¢
Nos. 21, 24, 27.....70&10¢
Nos. 22, 23, 25.....60&10&5¢
Nos. 13, 26, 36, 37.....70&10&5¢
Amidon's.....75&10¢@80¢
Barker's Imp'd Plain.....65&10¢@70¢
Barker's Imp. Nickeled.....75&10¢@80¢
Barker's Imp. Polished.....40&10¢@40&10&5¢
Globe Jawed.....40&10¢@40&10&5¢
Corner Brace.....40&10¢@40&10&5¢
Universal, 8 in., \$2.10; 10 in., \$2.25
Buffalo Ball.....\$1.10@1.15
Barber's.....50&10¢
Bartholomew's.....50&10¢@60&5¢
Nos. 117, 118, 119.....70¢@70&5¢
Common Ball, American.....\$1.00@1.10
Davis Patent.....50&10¢
Fray's Genuine Spotted.....50&5¢@50&10¢
Fray's Nos. 70 to 120, 81 to 123, 207 to 414.....50&10¢
Ives' New Haven Novelty.....70¢@70&5¢
New Haven Ratchet.....60&5¢@60&10¢
Barber Ratchet.....60&5¢@60&10¢
Barber's.....60&5¢
Spotted.....60&5¢@60&10¢
P. S. & W. Co., Peck's Patent.....60¢
Rose & Johnson.....50¢
Saxton's.....75&10¢@80¢
Barker's Imp. Polished.....65&10¢@70¢
Barker's Imp. Nickeled.....50&10¢@60¢
Ratchet, Polished.....40&10¢@40&10&5¢
Ratchet, Nickeled.....40&10¢@40&10&5¢
Buffalo Ball.....net, \$1.10@1.15

Brackets—

Shelf, fancy.....70¢@70&10¢
Sargent's list.....60&10¢@70&10¢
Other makes at a wide range of prices.
Shelf, plain.....65¢@70¢
Sargent's list.....60&10¢@70&10¢
Bradley Shelf Brackets.....70&10¢

Bright Wire Goods—See Wire.

Brollers—

Hen's Self-Inch.....9 10 9x11
Basting.....\$ per doz. \$4.50 5.50 6.50
Morgan Odorless.....\$ doz. 12, 60¢
New Haven.....50¢
Queen City.....39¢
Wire Goods Co.....65&10¢

Buckets, Well—

Galvanized—
Hill's.....\$ doz. 12 qt. \$2.25; 14 qt. \$2.55
Iron Clad.....\$ doz. 14 qt. \$4.25@4.50

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers, Butcher's.

Butts—

Brass—
Cast Brass, Fast.....39¢@40¢
Cast Brass, Loose Joint.....39¢@40¢
Cast Brass, Tiebout's.....50¢
Wrought Brass.....80&10¢@80&10&5¢

Cast Iron—

Fast Joint, Broad.....60¢@60&5¢
Fast Joint, Narrow.....60¢@60&5¢
Loose Joint, Japanned.....75&10¢
Loose Joint, Jap. with Acorns.....80¢
Loose Pin, Acorns.....75&10¢
Loose Pin, Acorns, Japanned.....80¢
Loose Pin, Acorns, Japanned, Plated Tips.....80¢
Mayer's Hinges.....60¢
Parliament Butts.....60¢

Wrought Steel—

Fast Joint, Broad.....60¢@60&5¢
Fast Joint, Narrow.....60¢@60&5¢
Fast Joint, Lt. Narrow.....60¢@60&5¢
Inside Blind, Light.....60¢@60&5¢
Inside Blind, Regular.....60¢@60&5¢
Loose Joint, Broad.....60¢@60&5¢
Loose Pin.....60¢@60&5¢
Loose Pin, Back Flaps, &c.....60¢@60&5¢
Bronzed Wrought Butts.....50&10¢@50&10&5¢

Cages, Bird—

Hendryx, Brass.....10¢@50¢
Hendryx, Enameled.....40¢@50¢

Callipers—See Compasses.

Calks

Burke's, One Prong, Blunt.....44¢@50¢
Burke's, One Prong, Sharp.....52¢@60¢
Burke's, Two Prong, Blunt.....52¢@60¢
Burke's, Two Prong, Sharp.....62¢@70¢
Gautier, One Prong, Blunt.....52¢@60¢

Can Openers—See Openers, Can.

Cans, Milk—

S. S. & Co.: 5-gal., \$3.00; 8-gal., \$4.40;
10-gal., \$4.75 each.....40&10¢

Cans, Oil—

Galvanized Blue Band, 1 gal., # doz. \$2.25
Galvanized Blue Band, 5 gal., Tip-Top, # doz. \$12.30
Galvanized Blue Band, 5 gal., Faucet, # doz. \$8.00
Glass Oil, Friend.....\$ doz. \$2.75

Caps—

Percussion—
Hicks & Goldmark's and Union Metallic
Cartridge Co. # 1009.....\$1.00
Eley's E. B.....56¢@58¢
Eley's D. Waterproof, Central Fire, #1.00
E. B. Grnd. Edge, Cent. Fire, 1-10's.....47¢@50¢
E. B. Trimmed Edge, 1-10's.....47¢@50¢
F. L. Waterproof, 1-10's.....35¢@37¢
G. D.....27¢@30¢
Musket, Waterproof, 1-10's.....50¢@53¢
S. B. Genuine Imported.....45¢

Primers—

Berdan Primers, \$1.00.....25¢
B. L. Caps (Sturtevant Shells) \$1.00.....25¢
All other Primers, \$1.20.....25¢

Cards—

Watson's Cotton, Wool, Horse and
File, list January 28, 1891.....25¢

Carpet Stretchers—See Stretchers, Carpet.

Cartridges—

B. B. Caps, Con. Ball, Swgd., \$1.85@1.90
B. B. Caps, Round Ball.....\$1.60@1.65
Blank Cartridges, except 22 and 32 cal.,
additional 10% to above discounts.
Black Cartridges, 22 cal., \$1.75.....25¢
Black Cartridges, 32 cal., \$3.50.....25¢
Cent. Fire, Military and Sporting.....15¢@25¢
Cent. Fire, Pistol and Rifle.....25¢@35¢
Primed Shells and Bullets.....15¢@25¢
Rim Fire Cartridges.....60¢@65¢
Rim Fire Military.....15¢@25¢

Carpet Sweepers—See Sweepers, Carpet.

Casters

Bed.....\$55¢@55&10¢
Plate.....\$60¢@60&10¢
Shallow Socket.....40&10¢
Deep Socket.....40&10¢
Giant Truck Casters.....35¢
Gwinner's Common Senses.....45¢
Gwinner's Hercules.....45¢
Martin's Patent (Phoenix).....45&10¢@50&10¢
Payson's Anti-friction.....70¢@70&10¢
Payson's Truck.....60¢@60&10¢
Socket Truck Casters.....50¢@50&10¢
Stationary Truck Casters.....50&10¢
Tucker's Patent, low list.....45¢
Yale Casters, low list.....45¢
Yale, Gem.....70¢

Cattle Leaders—See Leaders, Cattle.

Cement—

Victor Elastic.....5 lb pails \$ d

Chain—

American Coll, in cask lots, 3-18
3-18 ¼ 5-18 ¼ 7-18 ¼ 9-18 ¼
\$7.60 6.30 4.45 3.80 3.05 3.60 3.30 3.25
Less than cask lots, 4¢ @ 4¢ @ 4¢ @ 4¢
German Coll, list July 12, 1892.....60¢@60&10¢

German Halter Chain, list July 12, 1892.....60¢@60&10¢

Trace, Wagon and Fancy Chains.....60¢@60&10¢

Chalk Lines—See Lines.
Checks, Door—
 Unity 50%
Chisels—
Socket Framing and Firmer
 Mfr.
 Ohio Tool Co. 75¢10¢80%
 P. S. & W.
 Withby 30%
 Buck Bros 30%
 Charles Buck 30%
 Douglass 70¢75¢10%
 Merrill 60¢10¢60¢10¢5%
 L. & I. J. White 30¢30¢5%
Tanged and Miscellaneous
 Buck Bros 30%
 Charles Buck 30%
 Butchers' \$4.75 to \$5.00 to 2
 Spear & Jackson's \$5 to 2
 Tanged Firmers 50¢50¢10%
 Cold Chisels, fair quality, 2 1/2 14¢16¢
Chucks—
 Beach Pat. each, \$8.00 20%
 Danbury each, \$6.00, 30¢30¢5%
 Graham Patent 75¢20¢20%
 Morse's Adjustable, each, \$7.00, 20¢20%
 Syracuse, Balz Pat. 25%
 Skinner's Patent Chucks 30%
 Combination Lathe Chucks 33%
 Drill Chucks 15%
 Independent Lathe Chucks 40%
 Universal Lathe Chucks 40%
 Union Mfg. Co.
 Combination 40%
 Independent 40%
 Universal 40%
 Victor \$8.50, 25%
Churns—
 McDermald, Star Barrel Churn, each
 6 gal., \$2.00, 10 gal., \$2.75; 15 gal.,
 \$3.00; 20 gal., \$3.25
 Tiffin Union, each, 6 gal., \$3.25; 7 gal.,
 \$3.75; 10 gal., \$4.25
Clamps—
 Adjustable, Cincinnati 15¢10%
 Adjustable, Hammers 15¢15¢5%
 Adjustable, Stearns' 30¢30¢10%
 Barnes' Machinists' Clamps 33%
 Carpenter's, Cincinnati 75¢10%
 Carriage Makers, P. S. & W. Co. 40¢10%
 Carriage Makers', Sargent's 75¢75¢5%
 Eberhard Mfg. Co. 40¢40¢10%
 R. I. Tool Co.'s Wrought Iron 25%
 Saw Clamps, see Vises, Saw Filers'
 Stearns' Malleable, with Wrought Iron
 Screw 40¢10¢40¢10%
 Warner's 40¢10¢40¢10%
Cleavers, Butchers'—
 Beatty's 40¢40¢5%
 Bradley's 25¢30%
 Foster Bros 30%
 New Haven Edge Tool Co.'s 40%
 Nichols Bros 30%
 P. S. & W. Co. 33%
 Schulte, Lohoff & Co. 40¢40%
 L. & I. J. White 20¢5%
Clips—
 Baker Axle Clips 25%
 Norway, Axle, 4 & 6-16 55¢5%
 Norway Spring Bar Clips, 5-16 60¢5%
 2d grade Norway Axle 4 & 6-16 55¢5%
 Steel Felloe Axle Clips 70%
 Superior Axle Clips 70%
 Wrought Iron Felloe Clips 70%
Cloth and Netting, Wire
 —See Wire, &c.
Cockeyes
Cocks Brass—
 Hardware list (Globe, Kerosene, Lever
 Bibbs, Racking, &c.) 60¢2¢60¢10%
Coffee Mills—See Mills, Coffee.
Collars Dog—
 Brass, Pope & Stevens' list 40%
 Chapman Mfg. Company, new list 40%
 Embossed, Gilt, Pope & Stevens' list 30¢14%
 Leather, rope & Stevens' list 40%
 Medford Fancy Goods Co. 40¢10¢50%
Combs Curry—
 American Curry Comb Co. 33%
 Fitch's 50¢10¢50¢10%
 Gibb's Magnetic 40¢, \$2.00
 Kohler's Humane 40¢, \$1.75
 Kohler's Magic Oscillating 40¢, \$2.00
 Rubber, per doz, \$10.00 25%
Compasses, Dividers & C.
 Compasses, Callipers, Dividers, 70¢10¢75%
 Bemis & Call Co.'s
 Dividers 65%
 Callipers, Call's Patent Inside 65%
 Callipers, Double 65%
 Callipers, Inside or Outside 65%
 Callipers, Wing 60%
 Compasses 60¢5%
 Excelsior 50%
 Starrett's
 Combination Dividers 25%
 Lock Callipers and Dividers 25%
 Spring Callipers and Dividers 25%
 Stevens & Co.'s 25%
Coolers, Water—
 S. S. & Co.: 2-gal., \$2.00; 3-gal., \$2.50;
 4-gal., \$2.75; 6-gal., \$3.40 each 33%
Coopers' Tools—
 See Tools, Coopers'.
Cord—Sash—
 Braided, Crown Drab and Fancy, 2
 D. 55¢
 Braided, Crown White, 2 D. 50¢
 Cable Laid Italian Sash 10¢10%
 Common 8¢
 Common Russia Sash 12¢13%
 Egyptian, India Hemp, Braided 26%
 India Cable Laid Sash 11¢12%
 Massachusetts, White 22¢14%
 Ossawaun Mfg. Co.
 Braided, Giant, Drab and Fancy, 2
 D. 55¢
 Braided, Giant, White, 2 D. 30¢
 Patent, good quality 10¢10%
 Patent Russia Sash 13¢14%
 Ramson
 Braided, Drab Cotton 42¢
 Braided, Italian Hemp 42¢
 Braided, Linen 42¢
 Braided, White Cotton 42¢
 Semper Idem, Braided, White 42¢
 Silver Lake
 A quality, Drab, 55¢ 25%
 A quality, White, 55¢ 25%
 B quality, Drab, 35¢ 10%
 B quality, White, 30¢ 10%
 Sylvan Spring, Extra Braided, Drab, 35¢
 Sylvan Spring, Extra Braided, White, 35¢
 Tate's Solid Braided
 Economy, Drab 27¢
 Economy, White 27¢
 Hercules, Drab 22¢
 Hercules, White 22¢
 White Cotton Braided, fair 25¢

Wire Picture—
 Braided or Twisted 30¢5¢80¢15%
Corkscrews—See Screws, Cork.
Corn Knives and Cutters
 —See Knives, Corn.
Crackers, Nut—
 Acme
 Japanned, 2 gro., \$30 50%
 Nickel Plated, 2 gro., \$30 40%
 Blake's Pattern, 2 doz, \$2.00 10%
 Table (H. & B. Mfg. Co.) 40%
 Turner & Seymour Mfg. Co. 50%
Cradles—
 Grail 50¢2¢50¢5¢5%
Crayons—
 White Crayons, 2 gross 70¢8%
 D. M. Steward Mfg. Co.
 Metal Workers', 2 gross, \$2.50 25%
 Railroad, 2 gross 25%
 Rolling Mill, 2 gross 25%
 Soapstone Pencils, 2 gross, 1.50 25%
 See also Chalk.
Creamery Pails—See Pails,
Creamery.
Crow Bars—See Bars, Crow.
Curry Combs—
 See Combs, Curry.
Cutters—
Meat—
 American 30%
 Nos. 1 2 3 4 B 5
 Each \$5 \$7 \$10 \$25 \$50 \$80
 Enterprise 10 12 22 32 42
 No. 1 \$3 \$2.50 \$4 \$6 \$15
 Dixon's, 2 doz 40¢40¢5%
 Nos. 1 2 3 4
 \$14.00 \$17.00 \$19.00 \$30.00
 Draw Cut, each, 6 8
 No. 6 \$50 \$75 \$80 \$225 20¢25%
 Hale's, 2 doz 70%
 Nos. 11 12 13
 \$27.00 \$33.00 \$45.00
 Home No. 1, 2 doz, \$28.00 55¢10%
 Little Giant, 2 doz 40¢10¢50%
 Nos. 305 310 312 320 322
 \$55.00 \$48.00 \$44.00 \$72.00 \$68.00
 Miles' Challenge, 2 doz 45¢45¢10%
 Nos. 1 2 3
 \$22.00 \$30.00 \$40.00
 Triumph No. 505, 2 doz, \$21.00 25¢30%
 Woodruff's, 2 doz 40¢40¢5%
 Nos. 1 2 3
 \$15.00 \$18.00 \$18.00
 Chadborn's Smoked Beef Cutter, 2 doz 68¢10%
 Enterprise Beef Shavers 20%
Saw and Kraut—
 Tucker & Dorsey Mfg. Co.:
 Kraut Cutters 40%
 Saw Cutters, 1 Knife, 2 gross, \$21.00
 Saw Cutters, 2 Knife, 2 gross, 30.00
Tobacco
 Acme 2 doz, \$20.00, 40%
 All Iron 2 doz, \$4.25
 Champion 20¢10¢30%
 Nashua Lock Co.'s, 2 doz, \$18.00, 60¢55%
 National 2 doz, \$21.00, 30%
 Sargent's 2 doz, \$24.00, 55¢10%
 Wilson's 65%
Washe
 Appleton's 2 doz, \$16.00, 60¢10%
 Bonney's 2 doz, \$20.00, 30%
 Cincinnati 25¢10%
 Johnson's 2 doz, \$11.00, 33%
 Penny's, 2 doz, Pol. \$14; Jap'd, \$16, 55%
 Smith's Pac. 2 doz, \$12.00, 20¢10%
Diggers, Post Hole, &c.—
 Cronk's Post Bars, 2 doz, \$80.00,
 50¢50¢50¢10%
 Eureka Diggers 2 doz, \$11.00, 2¢1.50
 Fletcher Post Hole Augers, 2 doz, \$36.00,
 20¢20¢10%
 Gem, Improved, 2 doz, \$9.00, 20¢10%
 Gibbs' Columbia 2 doz, \$12.00
 Gibbs' Hustler 2 doz, \$12.00
 Gibbs' Imperial 2 doz, \$7.50
 Gibbs' National 2 doz, \$12.00
 Gibbs' Post Hole Digger 2 doz, \$12.75
 Kohler's Hercules 2 doz, \$14.00
 Kohler's Invincible 2 doz, \$12.00
 Kohler's Little Giant 2 doz, \$18.00
 Kohler's New Champion 2 doz, \$8.00
 Ryan's 2 doz, \$20.00, 10%
 Samson, 2 doz, \$34.00 25¢25¢10%
 Scheider 2 doz, \$18.00
 Shimer's Hollow Handle, 2 doz, \$24.00,
 50%
 Vaughan's Post Hole Auger, 2 doz, \$8.50 to \$9.50
Dividers—See Compasses.
Dog Collars—See Collars, Dog.
Door Checks—
 See Checks, Door.
Door Springs—
 See Springs, Door.
Drawers
 Money, 2 doz \$18 to \$20
 Waddell's Improved, No. 1, 2 doz, \$15.00
 Waddell's Improved No. 2, 2 doz, \$18.00
 Waddell's Desk and Drawer, each, \$7.50
 Waddell's Desk and Show case, each, \$7.50
Drawing Knives—
 See Knives, Drawing.
Drills and Drill Stocks—
 Bench Drills, Stearns' 50%
 Blacksmiths', 2 doz, each \$1.75
 Blacksmiths', 2 doz, each \$1.75
 Automatic Boring Tools 1.75 to \$1.85
 Breast, Bartholomew's each \$2.50
 25¢10¢40%
 Breast, Millers Falls each \$3.00, 25%
 Breast, P. S. & W. 40¢10%
 Breast, Wilson's 30¢5%
 Chisolepe Automatic Drill 40¢10%
 Goodell Automatic Drills, 40¢40¢10%
 Ratchet, Curtis & Curtis 30%
 Ratchet, Ingersoll's 25%
 Ratchet, Merrill's 20¢20%
 Ratchet, Moore's Triple Action 25¢30%
 Ratchet, Parker's 20¢20%
 Ratchet, Weston's 20¢25%
 Ratchet, Whitney's 20¢10%
 Whitney's Hand Drill, Plain, \$11.00,
 Adjustable, \$12.00 20¢10%
Twist Drills—
 Cleveland 50¢10¢10%
 Diamond, W. & B. 50¢10¢10%
 Graham's Pat. Groove Shank, 50¢10¢10%
 Morse 50¢10¢10%
 New Process 50¢10¢10%
 Standard 50¢10¢10%
 Syracuse (Metal list) 50¢10%

Drill Bits or Bit Stock
Drills—See Augers and Bits.
Drill Chucks—See Chucks.
Dripping Pans—
 See Pans, Dripping.
Drivers, Screw—
 Allard's Spiral, new list 25%
 Brass Screw Drivers 25¢10%
 Buck Bros 30%
 Buck Bros' Screw Driver Bits 27%
 Clark's Pat. 30¢33%
 Cincinnati 25¢10%
 Champion 25¢10%
 Douglass Mfg. Co. 50%
 Ellrich's Sore and Ratchet, 25¢25¢10%
 Fray's Hol. H. dle Sets, No. 3, \$12.00, 45%
 Gay & Parsons 5%
 Goodell's Automatic 50¢10¢5%
 Knapp & Cowles 70¢10%
 No. 1 70¢10%
 No. 3 70¢10%
 Nos. 4 and 60. Acme and Ideal 60¢10%
 Kolb's Common Sense, 2 doz, \$8.00,
 25¢10%
 Mayhew's Black Handle 60%
 Mayhew's Monarch 45¢10%
 P. S. & W. Co. 70%
 Sargent & Co.
 No. 1, Forged Blade 60¢10¢10%
 Nos. 20, 40 and 60 60¢10¢10%
 Screw Driver Bits, Parr's, 2 gross, \$6.25
 Screw Driver Bits 2 doz, 60¢75¢
 Stanley R. & L. Co.'s
 No. 6, Varnished Handles 65¢10%
 70¢10%
 Stearns' 25¢10%
 Syracuse Screw Driver Bits 30¢30%
 C. T. Williamson Wire Novelty Co. 60%
Egg Beaters—See Beaters, Egg.
Egg Poachers—
 See Poachers, Egg.
Electric Bell Sets—
 See Bells, Electric.
Emery—No. 4 to No. 54 to Flour, CF
 46 gr. 150 gr. F.F.F.
 Kegs, 2 D. 47¢ 5 3 3
 48 grs, 2 D. 44¢ 5 3 3
 48 grs, 2 D. 5 5 5
 10-cans, 10 6 6 6
 10-cans, less 6 6 6
 than 10 10 6 6
Enameled and Tinned
Ware—See Ware, Hollow
Escutcheon Pins—
 See Pins, Escutcheon.
Escutcheons—
 Brass Thread 60¢60¢10%
 Door Lock Same dis. as Door Locks.
 Wood 25%
Expanded Metal—
 List No. 5.
 Door Mats, Galvanized 25%
 Fencing, Painted Sheets 20%
 Lathing 10%
 Netting, Painted Sheets 20%
 Tree Guards, Panoled 15%
 Window Guards, Panoled 15%
Extractors, Lemon Juice
 —See Squeezers, Lemon.
Fasteners, Blind—
 Austin & Eddy No. 2008 2 gr., \$9.00
 Mackrell's, 2 doz, \$1.00 20¢10%
 Security Gravity 2 gr., \$9.00
 Van Sand's Old Pat, \$15 gr 55¢10%
 Van Sand's Screw Pat, \$15 gr 60¢10%
 Zimmerman's 55¢10%
Faucets—
 B. & B. Co.
 Vest's Lock, Open and Shut Key 50%
 Burnside's Red Cedar 50%
 Burnside's Red Cedar, bbl. lots 50¢10%
 Cork Lined 70¢5¢70¢10%
 Penn's 40%
 Penn's Cork Stops 33%
 Fray's Pat. Petroleum 60¢10%
 Metallic Key, Leather Lined 60¢10%
 National Measuring, 2 doz, \$36.00 25¢10%
 John Sommers
 Peerless Best Block Tin Key 40%
 IXL, 1st quality, Cork Lined 50%
 Diamond Lock 40%
 Perfection, Fla. Red Cedar (in bbls.) 50¢10%
 Western Pattern Metal Key 40%
 No Brand Metal Key 60%
 Self Measuring
 Enterprise, 2 doz, \$36.00 25¢10%
 Lane's, 2 doz, \$36.00 25¢10%
 Star 30%
 Star, Metal Plug, new list 40%
 Lockport, Metal Plug, reduced list 60%
Felloe Plates—
 See Plates, Felloe.
Fibre Ware—See Ware, Fibre.
Fifth Wheels—
 Brewster 50¢5%
 Derby and Cincinnati 45¢5%
Files—
Domestic—
 American 70¢70¢10%
 Arcade 60¢10¢10%
 C. & H. Barnett (Black Diamond) 60¢10¢10%
 80¢10¢10%
 Eagle 60¢10¢10%
 Nicholson Files, Rasps, &c. 60¢10%
 @70%
 Nicholson (X.F.) Files 25%
 Nicholson's Royal Files (Seconds) 75%
 Other makers, best brands, 70¢70¢10%
 Fair brands 75¢75¢5%
 Second quality 80¢80¢10%
 Arcade Horse Rasps 50¢10¢50%
 Chelsea Horse Rasps, Hand Cut 50¢10%
 Keller's Horse Rasps 50¢10¢50%
 Keller's Horse Rasps 50¢10%
 Trojan Horse Rasps 60¢10%
Imported—
 Butcher Butcher's list, 20%
 Stubbs' list 75¢80%

Fixtures Grindstone—
 Moore's 55%
 P. S. & W. Co. 50¢10%
 Reading Hardware Co. 80¢10%
 Sargent's Patent 70¢10%
Fluting Machines—
 See Machines, Fluting.
Fodder Squeezers—
 See Squeezers, Fodder.
Forks—
 Hay, Manure, &c. Asso. List, 70¢70¢5%
 Hay, Manure, &c., Phila. List, 60¢60¢10%
 Flated, see Spoons.
Frames—Saw—
 Red, Polished and Varnished, 2 doz \$1.50, 25%
 White Vermont, 2 gro., \$9.00, \$10.00
Screen, Window and Door
 Bonanza Window Screens, 50¢50¢10%
 Corland 40¢40%
 Empire Fancy Screen Doors, 2 doz \$1.15
 Phillips' Window Screen Frames 50¢50%
 Porter's Pat. Window and Door Frame 50%
 Stearns' Frames and Corners, 25¢25¢10%
 Washab Adjustable Window Screen 40%
 Warner's Screen Corner Irons, 33%
Freezers, Ice Cream—
 American 60%
 Arctic 70¢70%
 Blizzard 70%
 Boss and Pat. 60¢10¢10%
 Champion 65¢65%
 Confectioners' Machine 60%
 Crown 60%
 Double Action Crown 60%
 Gem 65¢65%
 Giant 60%
 Good Luck 65¢65%
 Granite State 65¢65%
 Keystone, F. D. & Co., each, \$1.50, 20%
 Model 60¢60%
 Ohio 60¢10%
 Peerless 60¢10%
 Shepherd's Lightning 65¢65%
 Standard 60¢60%
 Standard Double Action 60¢60%
 Star 60%
 White Mountain 60¢60%
 Zero 70%
Fruit and Jelly Presses—
 See Presses, Fruit and Jelly.
Fruit Pickers—
 See Pickers, Fruit.
Fry Pans—See Pans, Fry.
Funnels—
 Gersdorf's Perfection, Standard and
 Globe; 7 in, 1 gro., 10%; 2 to 5 gro.,
 20%; 5 to 10 gro. 30%
 Copper, 1 to 6 doz, 15%; 6 to 12
 doz, 20%; over 12 doz 25%
Furnaces, Soldering—
 Burgess No. 3 Gem, Copper reservoir, \$8.50
 Burgess No. 3 Gem tin reservoir, \$7.00
 Clayton & Lambert No. 1 Fire-Pot,
 complete \$6.00
Fuse—Dis. 10¢2¢ cash. 2 1/2 1000 ft.
 Common Cotton Fuse, for dry ground, \$3.00
 Common Hemp Fuse, for dry ground, 2.80
 Double Taped Fuse, for very wet gr., 5.60
 Single Taped Fuse, for wet ground, 4.75
 Triple Taped Fuse, for very wet gr., 6.40
 Large Gutta Percha Fuse, for water, 15.00
 Small Gutta Percha Fuse, for water, 10.00
Gates Molasses—
 Boss, 2 doz \$10.00
 No. 1, \$7; No. 2, \$8; No. 3, \$9; No. 4,
 \$10 60¢10¢70%
 Lincoln's Pattern 70¢70%
 Stebbins' Genuine 80¢10%
 Stebbins' Pattern 80¢10%
 Stebbins' Tinned Ends 20¢10%
 Weed's 20¢10%
Gauges—
 Barrett's Comb. Roller Gauge 25%
 Hoague & Peck's Champion Gauge 50%
 With Scale 25%
 Without Scale, in bxs. 20%
 Marking, Mortise, &c. 60¢10%
 Stanley R. & L. Co.'s Butt and Rabbet
 Gauge 25%
 Starrett's Surface, Center and Scratch,
 25%
 Wire, Brown & Sharpe's 10¢20%
 Wire, Morse's 25%
 Wire, P. S. & W. Co. 10¢10%
 Wire, Wheeler, Madden & Co. 10%
Gimlets—
 Nail and Spike 50¢10%
 Diamond Gimlets 50%
 Eureka Gimlets 60¢10%
 Double Cut, Douglass' 40¢10%
 Double Cut, Ives' 60¢60%
 Double Cut, Shepardson's 45¢45%
Glue—
 Dodd's Liquid Glue 25¢25%
 Improved Process 25¢25%
 Le Page's Liquid 25¢25%
 Upton's Liquid 35%
Glue Pots—See Pots, Glue.
Grease, Axle—
 Axle, tin boxes 2 gross \$12.00
 Dixon's Everlasting, 10-b pails, ea. 85¢
 Dixon's Everlasting, in bxs, 2 doz 1 m
 \$1.20; 2 doz 2 m \$2.00
 English Coach, 5-b tin pails, 2 doz, \$3.00
 English Coach, wooden boxes 2 gross \$3.50
 Fraser's 2 doz \$4.46, Fall 2 m 5¢
 Fraser's, in boxes 2 gross \$9.50
 Lower grades, special brands 2 gross \$7.00
Grindstones—
 Family, regular list 60%
 Family, Cleveland Stone Co. 20%
Grindstone Fixtures—
 See Fixtures, Grindstone.
Gun Powder—See Powder.
Hack Saws—See Saws.
Hatts Awl—
 P. S. & W. Co., 1st quality, 2 doz 45¢50%
 P. S. & W. Co., 2nd quality, 2 doz 40¢45%
 Sewing, Brass Pat., 2 gr \$1.75
 Sewing, Pat., Long 2 doz \$1.20
 Sewing, Pat., Short, 2 doz 45¢50%

Halters—
 Covert's Ad. Rope Halters.....40¢
 Covert's Ad. Web Halters.....35¢
 Covert's Hemp Horse and Cattle Tie.....50¢
 Covert's Jute Cattle Ties.....70¢
 Covert's Jute Horse Ties.....70¢
 Covert's Rope, 7-16 in., Jute.....70¢
 Covert's Rope, 1 in., Hemp.....60¢
 Covert's Rope, Jute.....60¢
 Covert's Saddlery Works Halters.....35¢
 Covert's Saddlery Works Handy Web Halters.....35¢
 Covert's Saddlery Works Horse and Cattle Ties.....35¢

Hammers—
Handled Hammers—
 Aha Tool Co.....50¢
 Buffalo Hammer Co.....50¢
 Humason & Beckley.....50¢
 Verree.....40¢
 Cheney's Claw.....40¢
 Cheney's Claw & Ratchet.....50¢
 C. Hammond & Son.....40¢
 Magnetic Tack, Nos. 1, 2, 3, 1.25, 1.50 & 1.75.....30¢
 Maydole's, Hist Dec. 1, '85.....25¢
 Nelson Tool Works.....40¢
 Peck, Stow & Wilcox.....35¢
 Fayette R. Plumb.....40¢
 Artisan's Choice A. E. Nail.....40¢
 Horseshoe Turning Hammers.....50¢
 Regular Y. & P. A. E. Nail.....50¢
 Other Hammers.....50¢
 Sargent's.....40¢
 Warner & Nobles, new list.....25¢

Heavy Hammers and Sledges—
 3 lb and under.....75¢
 5 to 10 lb.....75¢
 Over 10 lb.....80¢
 Wilkinson's Sledge.....10¢

Handcuffs and Irons—
 See Police Goods.

Handles—
Cross-Cut Saw Handles—
 Atkins', new list.....40¢
 Champion.....15¢
 Ely's Perfection.....40¢
 Sensible.....40¢

Iron, Wrought or Cast—
 Barn Door, 1 doz.....10¢
 Bronze Iron Drop Latches.....10¢
 Chest and Lifting.....10¢
 Door or Thumb.....10¢
 Nos. 1 2 3 4
 Per doz.....1.00 1.00 1.00 1.50
 Jap'd Store Door Handles—Nuts, 1.62;
 Plate, 1.10; no plate, .88.....net
 Roggin's Latches.....10¢

Wood—
 Auger, assorted.....50¢
 Auger, large.....50¢
 File, assorted.....50¢
 Brad A.W.L.....50¢
 Apple Firmer Chisel, ass'd.....50¢
 Apple Firmer Chisel, large.....50¢
 Hickory Firmer Chisel, ass'd.....50¢
 Hickory Firmer Chisel, large.....50¢
 Socket Firmer Chisel, ass'd.....50¢
 Socket Framing Chisel, ass'd.....50¢
 Chisel, Fibre Head.....50¢
 Hammer, Hatchet, Axe, &c.....50¢
 Hoe, Rake, Shovel, &c.....50¢
 Pat. Auger, Douglass.....50¢
 Pat. Auger, Ives.....50¢
 Pat. Auger, Swan's.....50¢
 Saw and Plane.....50¢
 J. H. Smith & Co's Pat. File.....50¢

Hangers—
 Barn Door, New England.....70¢
 Barn Door, old patterns.....70¢
 Barry.....50¢
 Best Anti-Friction.....50¢
 Boss.....50¢
 Carrier Steel Anti-Friction.....50¢
 Champion.....50¢
 Chicago Anti-Friction.....50¢
 Climax Anti-Friction.....50¢
 Cincinnati Nos. 1, 2, 2.25; 3, 2.50; 4, 2.50.....50¢
 Crescent.....50¢
 Cronk's Patent, Steel Covered.....50¢
 Duplex (Wood Track).....50¢
 Economy.....50¢
 Hamilton Wrought Steel Track.....50¢
 Interstate.....50¢
 Kidder's.....50¢
 Lane's New Standard.....50¢
 Lane's Parlor.....50¢
 Lane's Standard.....50¢
 Lundy, Steel Parlor.....50¢
 Magic.....50¢
 Matchless.....50¢
 Moody.....50¢
 Moore's Baggage Car Door.....50¢
 Moore's Elevator.....50¢
 Moore's Railroad.....50¢
 Nickel, Steel, Nos. 0, .25; 1, .25; 2, .25; 3, .25; 4, .25.....50¢
 Orleans Steel.....50¢
 Paragon Nos. 5, 5.5, 7 and 8.....50¢
 Pendulum, Payson's.....50¢
 Perfection.....50¢
 Richards.....50¢
 Samson Steel Anti-Friction.....50¢
 Stat.....50¢
 Stearns' Anti-Friction.....50¢
 Stearns' Challenge.....50¢
 Sterling.....50¢
 Terry's Ideal.....50¢
 Terry's Modern.....50¢
 Terry's Shield.....50¢
 Terry's Solid.....50¢
 Terry's Wrought Single Strap.....50¢
 Victor, No. 1, 1.50; No. 2, 1.50; No. 3, 1.80.....50¢
 Warner's Pat.....50¢
 Wild West.....50¢
 Zenith for Wood Track.....50¢

Harness Snaps—See Snaps.
Hatchets—
 American Axe and Tool Co.....40¢
 Blood's.....40¢
 Hunt's.....40¢
 Hurd's.....40¢
 Mann's.....40¢
 Underhill's.....40¢
 C. Hammond & Son.....40¢
 Fayette R. Plumb.....40¢
 Collins.....40¢
 Buffalo Hammer Co.....40¢
 Kelly's.....40¢
 P. S. & W. Co.....40¢
 Sargent's & Co.....40¢
 Schulte, Lohoff & Co.....40¢
 Ten Eyck Edge Tool Co.....40¢

Hay and Straw Knives—
 See Knives.

Blind Hinges—

Clark's
 Nos. 1, 3, 5, 1888, Old Pattern.....75¢
 Nos. 1 and 3, Tip Pattern.....75¢
 No. 50, Buffalo Noiseless, 40, 60, and 65.....75¢
 Buffalo Reversible, Nos. 3, 2, 1, 1 and 0.....75¢
 No. 1, Cottage, for wood only.....80¢
 No. 1, Diamond, for wood only.....80¢
 Dixie L. & P. Nos. 3, 2, 1, 1, 2, 0, 00, 4 and 5.....75¢
 No. 25, Empire Reversible.....75¢
 Lull & Porter, Nos. 3, 2, 1, 1, 1, 0, 00, 4 and 5.....75¢
 Mortise Gravity, Nos. 2, 4, 4, 6, 8, 9 and 10.....75¢
 Parker.....75¢
 North's Automatic Blind Fittings, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50.....10¢
 Reading's Gravity.....75¢
 Sargent's Nos. 1, 3, 5, 11, 12, 18.....75¢
 Western.....75¢

Gate Hinges—

Automatic.....50¢
 Clark's, Nos. 1, 2, 3.....50¢
 N. E. Reversible.....50¢
 N. E. Reversible.....50¢
 N. Y. State.....50¢
 Western.....50¢

Spring Hinges—

Acme.....30¢
 American, Gem and Star.....20¢
 Bardsley's Patent Checking.....15¢
 Barker's Double Acting.....25¢
 Bommer's Japanese.....35¢
 Bommer's All other Kinds.....30¢
 Buckman's.....16¢
 Champion.....60¢
 Chicago.....30¢
 Devore, No. 1.....13¢
 Empire and Crown.....12¢
 Freeport.....12¢
 Geer's Spring and Blank Butts.....40¢
 Hero and Monarch.....55¢
 Ideal No. 3.....55¢
 J. G. C. Covered.....50¢
 New Idea No. 1.....10¢
 New Idea No. 2.....10¢
 New Idea Dbl. Acting.....10¢
 No. 10 Matchless.....60¢
 No. 25 Unbreakable.....60¢
 Oxford.....20¢
 Reliable.....10¢
 Rex.....13¢
 Royal.....10¢
 Samson.....10¢
 Stearns' Noiseless Floor Hinge.....25¢
 Union Mfg. Co.....25¢
 Union Spring Hinge Co's list, March, 1886.....20¢
 U. S.....25¢
 Wiles, No. 1, 1 gro., \$10; No. 2, \$15.....15¢

Wrought Iron Hinges—

List February 14, 1891.
 Corrugated Strap and T.....50¢
 Strap and T.....50¢
 Plate Hinges, 8, 10, 12 in.....50¢
 "Providence" over 12 in.....50¢
 Rolled Blind Hinges, Nos. 32 and 34.....50¢
 Rolled Blind Hinges, Nos. 232 and 234.....50¢
 Rolled Plate.....50¢
 Rolled Raised.....50¢
 Screw Hook and Eye.....50¢
 Screw Hook and Eye.....50¢
 Strap.....50¢

Hoes—

Scovill and Oval Pattern.....50¢
 D. & H. Scovill.....20¢
 Grub.....60¢
 Lane's Crescent, Planters' Pattern.....45¢
 Lane's Razor Blade, Scovill Pat.....30¢

Handled—

Garden, Mortar, &c.....70¢
 Magle.....40¢
 Planter's, Cotton, &c.....70¢
 Warren Hoe.....60¢

Hog Rings and Ringers—
 See Rings and Ringers.

Holting Apparatus—
 See Machines, Holting.

Hollow-Ware—
 See Ware, Hollow.

Holders—

Sprengle's Pat.....50¢
 Angular.....50¢
 Diagonal.....50¢
 Extension.....50¢
 Barber's.....50¢
 Ives.....50¢

File and Tool—

Bals Pat.....50¢
 Nicholson File Holders.....20¢
 Sash.....50¢
 Motley's Adj. Sash, Medium Size.....50¢

Hooks—

Bird Cage, Reading.....60¢
 Bird Cage, Sargent's list.....60¢
 Clothes Line, Sargent's list.....55¢
 Clothes Line, Moore's.....70¢
 Clothes Line, Reading list.....60¢
 Coat and Hat, Moore's.....70¢
 Coat and Hat, Reading.....60¢
 Coat and Hat, Sargent's list.....60¢
 Hammock, E. C. Stearns & Co.....60¢
 Harness, Reading list.....55¢

Wire—

Atlas, Coat and Hat.....55¢
 Belt.....30¢
 Handy Hat and Coat.....50¢
 Indestructible Coat and Hat.....50¢
 Steady Ceiling Hooks.....50¢
 Williams's Bird Cage Hooks, list April, 1892.....40¢
 Wire Coat and Hat, Gem, list April, 1886.....60¢
 Wire Coat and Hat, Miles, list April, 1886.....50¢
 Wire Coat and Hat, Standard.....60¢
 Wright Wire Goods—See Wire.

Wrought Iron—

Cotton.....50¢
 Cotton Pat. (N. Y. Mallet and Handle).....30¢
 Tassel and Picture, T. S. Mfg. Co.....50¢
 Wrought Staples Hooks, &c.....50¢

Miscellaneous—

Bush.....55¢
 Fish Hooks, American.....60¢
 Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25.....60¢
 Hooks and Eyes—Brass.....60¢
 Hooks and Eyes—Malleable Iron.....70¢
 Nolin's Grass.....70¢
 Whittefree—Patent.....55¢
 Bench Hooks—See Bench Stops.

Horse Nails—See Nails, Horse

Horse Shoes—
 See Shoes, Horse.

Hose, Rubber—

Competition, Fair quality.....75¢
 Competition, Low Grade.....30¢
 Extra.....60¢
 N. Y. B. & P. Co., Dundee.....60¢
 N. Y. B. & P. Co., Extra.....40¢
 N. Y. B. & P. Co., Para.....25¢
 Standard.....70¢
 Cotton Garden, 1/4 in., coupled.....7¢
 Fair Quality, 1/4 in., coupled.....8¢
 Good Quality, 1/4 in., coupled.....8¢

Huskers—

Blair's Adjustable.....50¢
 Blair's Adjustable Clipper.....70¢
 Hubbard's Solid Steel.....45¢

Indurated Fiber Ware—
 See Ware, Indurated Fiber.

Irons. Curling—

Nicol's Patent Curling Iron Heater.....1.00
 Silver Tipped Grace Darling Curling Iron.....1.75
 No. 65.....1.50
 No. 66.....1.50
 No. 67, Mustache.....1.25

Sad—

From 4 to 10, at factory.....100¢
 B. B. Sad Irons.....2.30
 Chinese Laundry (N.E. Butt Co.).....3.34
 Chinese Sad.....3.34
 Crown Improved.....60¢
 Ideal Irons, new list.....50¢
 Mahony's Troy Pol. Irons.....50¢
 Mrs. Potts' Sad Irons, per set.....60¢
 Small lots......50
 National Self-Heating......50
 New England......50
 Salamander Irons......50
 Self-Heating......50
 Self-Heating Tailors'......50
 Sensible, list Jan. 91......50
 Sensible Tailors' Irons......50

Soldering—

Soldering Coppers.....10¢
 Covert's Adjustable, list Jan. 1, 1894.....25¢
 Tinker's Dread.....1.75

Pinking—

Pinking Irons, 1 doz., 55¢

Jack Screws—See Screws.

Jacks, Wagon—

Daisy.....33¢
 Lockport.....40¢
 Victor.....33¢

Kettles—

Brass, Spun, Plain, list Jan. 1, '91.....25¢
 Brass, Spun, Pld. W. M. list Jan. 1, '91.....25¢
 Stamped Brass Kettles.....25¢
 Enameled and Tea—See Ware, Hollow.

Knife Sharpeners—
 See Sharpeners, Knife.

Knives—

Ames' Bread Knives.....1.50
 Ames' Butcher Knives.....1.50
 Ames' Shoe Knives.....25¢
 Foster Bros' Butcher, &c.....40¢
 Jordan's A. A. Butchers', list.....20¢
 Moran's Shoe and Bread.....20¢
 Nichols' Butcher Knives.....40¢
 Wilson's Butcher Knives, list Dec 8, 1890.....25¢
 W. W. Wilson, Butcher, 6 in., \$2.00; 7 in., \$2.70; 8 in., \$3.80, &c.....25¢
 Hay and Straw—See Hay Knives.
 Table and Pocket—Net Prices.

Corn—

Bradley's.....10¢
 Wadsworth's.....25¢

Drawing—

Mix.....75¢
 P. S. & W.....75¢
 Witherby.....25¢
 Adjustable Handle.....25¢
 Bradley's.....35¢
 Douglass.....75¢
 Merrill.....60¢
 Watrous.....15¢
 L. & J. White.....20¢
 Wilkinson's Folding.....25¢

Hay and Straw—

Blizzard.....\$5.50
 Carter's Needle.....\$8.50
 Lightning, from Jobbers.....\$7.50
 Nolin's Hay.....\$8.50
 Wadsworth's.....\$4.00

Mincing—

Am. (2d quality), 1 gr., 1 blade, \$7; 2 blades, \$12; 3 blades, \$18.....net
 Buffalo Adjustable.....\$3.00
 Knapp & Cowles.....\$5.00
 Lathrop's.....\$2.00
 Smith's, 1 doz., Single, \$2; Double \$3.....45¢

Knobs—

Bardsley's Wood Door, Shutter, &c.....15¢
 Base, Rubber Tip.....70¢
 Carriage, Jap.....\$8.00
 Door, Mineral.....\$6.00
 Door, Por. Jap'd.....70¢
 Door, Por. Nickel.....\$2.00
 Door, Por. Plated Nickel.....\$2.25
 Drawer, Porcelain.....\$10.00
 Picture, Hematite.....\$5.50
 Picture, Judd's.....\$10.00
 Picture, Sargent's.....\$10.00
 Shutter, Porcelain.....\$5.10
 Yale & Towne Wood, list Dec., 1885.....40¢

Ladders.

Davies Extension and Single.....20¢

Ladies—

Melting, P. S. & W.....35¢
 Melting, Reading.....35¢
 Melting, Sargent's.....60¢
 Melting, Warners.....30¢

Lanterns—

Anti-Friction, with Guard.....\$4.50
 Brass Plated, Sq. Lift, Guard.....\$5.50
 Cop. Plated, Sq. Lift, Guard.....\$5.50
 O. K. with Guard.....\$3.75
 Regular, with Guard.....\$3.50
 Side Lift, with Guard.....\$4.00
 Square Lift, with Guard.....\$4.25

Bull's Eye Police—

2 1/2-inch flash light.....\$3.00
 3-inch flash light.....\$4.50
 2 1/2-inch regular.....\$3.60
 3-inch regular.....\$3.90

Lawn Mowers—
 See Mowers, Lawn.

Leaders, Cattle—

Hotchkiss.....30¢
 Humason, Beckley & Co's.....70¢
 Peck, Stow & W. Co.....60¢
 Sargent's.....70¢

Lemon Squeezers—
 See Squeezers, Lemon.

Lifters, Transom—

Bardsley & Mouat, Sure Grip.....50¢
 Excelsior.....50¢
 Payson's.....50¢
 Imperial.....50¢
 Solid Grip.....50¢
 Universal.....50¢
 Reith's, list Feb. 20, 1891.....30¢
 Brass, Real Bronze or Nickel Plate.....30¢
 Bronzed Iron Rods.....60¢
 Shaws.....50¢
 Wollensack's.....50¢
 Class 3 and 4, Brass.....50¢
 Class 3 and 4, Bronzed Iron.....50¢
 Class 3 and 4, Bronze Metal.....50¢
 Skylight Lifters.....25¢

Lines—

Chalk.....60¢
 Cotton and Linen Fish.....50¢
 Cotton Chalk.....50¢
 Mason's Colored Cotton.....45¢
 Mason's Linen, 8 ft. No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25.....25¢
 Mason's Linen, No. 3, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50.....25¢
 Ossawaun Mills.....50¢
 Braided Chalk.....50¢
 Cotton Clothes Lines.....10¢
 Solid Braided Ventilator and Mason's Lines.....25¢
 Twisted Chalk.....60¢
 Samson Cotton, No. 4, \$2; No. 4 1/2, \$2.50.....10¢
 Silver Lake, Braided, No. 0, \$3.00; No. 1, \$3.50; No. 2, \$7.00; No. 3, \$7.50.....25¢
 Ventilator Cord, Samson Braided, White or Drab Cotton.....\$7.50
 Wire Clothes.....18¢
 100 ft.....\$3.50 \$3.00 \$2.50

Links, Open—

Terry's—per gro.:
 Nos. 1 2 3 4
 \$6.00 8.00 12.00 16.00

Locks, &c.—

Cabinet—

Cabinet Locks.....50¢
 Barnes Mfg. Co.....40¢
 Deitz, Nos. 36 to 39.....40¢
 Deitz, Nos. 51 to 63.....40¢
 Deitz, Nos. 87 to 98.....30¢
 Champion Lock Latches.....40¢
 Eagle and Corbin Trunk.....35¢
 Champion Cab. and Combin.....35¢
 Romer's.....25¢
 Yale.....net price
 Barnes Mfg. Co.....40¢
 Britain, Graham & Mathes, list Jan. 1890.....60¢
 Brooklyn Latches.....50¢
 Deitz Patent Key.....30¢
 Mallory, Wheeler & Co. list July '88.....60¢

Plate.....\$3.40
 Romer's Night Latches.....15¢
 R. & E. Mfg. Co., list Mar. 20, 1889.....
 60¢100¢70¢
 Sargent & Co., list Apr. 1, 1894.....60¢100¢70¢
 Warner's Burglar Proof.....\$2.00, \$3.00, \$5.00
 Yale.....net prices

Elevator—

Moore's.....\$3.40

Padlocks—

Wrought Iron Padlocks:
 Brittan, Graham & Mathes, list Jan. 1, 1894.....75¢
 Mallory, Wheeler Co., list January 1, 1894.....75¢
 Norwich Lock Mfg. Co., list June 10, 1891.....50¢25¢
 Russell & Erwin Mfg. Co., list June 10, 1891.....50¢25¢
 Sargent & Co., list January 1, 1894.....75¢
 William Wilcox Mfg. Co., list January 1, 1894.....75¢
 Ames Sword Co. up to No. 150.....40¢
 Ames Sword Co. above No. 150.....50¢
 Barnes Mfg. Co.....40¢40¢10¢
 Champion Padlocks.....40¢
 A. E. Deltz.....40¢
 Eagle.....40¢
 Eureka, Eagle Lock Co.....40¢25¢
 T. T. Pral's Keystone Scandinavian.....40¢
 1010 line.....90¢40¢
 120 line.....90¢25¢
 109 line.....85¢
 510 line.....70¢10¢
 225, 610 and 200 lines.....70¢
 All other numbers.....50¢25¢
 Horseshoe.....\$2.00, \$3.00, \$5.00
 Hotchkiss.....30¢
 Nock's.....30¢
 Romer's Nos. 0 to 91.....30¢
 Romer's Scandinavian, &c., Nos. 100 to 505.....15¢
 Scandinavian.....90¢50¢
 Slaymaker, Barry & Co.....90¢50¢
 No. 1010 line.....90¢40¢
 No. 41 line.....60¢
 No. 61 line.....60¢
 No. 21 line.....80¢
 Star.....80¢
 Yale Lock Mfg. Co.'s.....net prices

Sash, &c.—

Attwell Mfg. Co.....25¢33¢4¢
 Champion Safety list January, 1893.....70¢5¢
 Clark's No. 1, \$10; No. 2, \$8 gr.....33¢4¢
 Common Sense, Jap'd, Cop'd and Br'zd.....gr \$4.00
 Common Sense, Nickel Plated.....gr \$10.00
 Corbin's Daisy, list Feb. 15, 1886.....70¢
 Davis Bronze, Barnes Mfg. Co.....70¢
 Ferguson's.....33¢4¢
 Fish (Liesche's pat.), No. 100, gr.....50¢
 No. 105, gr.....50¢
 Grant, list Jan. 1, 1892.....70¢25¢
 Hammond's Window Springs.....40¢
 Huginn's New Sash Locks.....25¢25¢2¢
 Huginn's Sash Balances.....25¢25¢2¢
 Ives' Patent.....60¢10¢5¢60¢10¢10¢
 Kempshall's Gravity.....60¢
 Kempshall's Model.....60¢60¢10¢
 Monarch.....50¢
 Payson's Perfect.....60¢10¢10¢
 Reading.....60¢10¢10¢60¢10¢10¢
 Security.....70¢
 Universal.....30¢
 Victor.....60¢10¢2¢
 Walker's.....10¢
 Wolcott's.....60¢10¢2¢

Lumber Tools—

See Tools, Lumber.
Lustro—
 Four-ounce bottles.....\$2.00, \$1.75; \$1.00
 gross.....\$17.00

Machines.

Boring—

Without Augers. Upright. Angular.
 Boss, Carpenters' 3.00 \$2.00
 Boss, Ship Bldrs' 3.35 \$2.00
 Douglas.....\$5.50 \$8.75.....50¢
 Jennings'.....5.50 6.75.....50¢50¢2¢
 Miller's Falls.....7.50.....25¢
 Phillips' Patent.....7.00 7.50.....40¢10¢10¢
 with Auger.....7.00 7.50.....40¢10¢10¢
 Snell's, Rice's Pat 5.50 6.75.....40¢10¢10¢

Fluting—

American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each.....35¢
 Combined Fluter and Sad Iron.....\$2.00, \$1.50.....30¢
 Crown, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$5.50 each.....35¢
 Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25.....30¢
 Crown Jewel, 6 in., \$3.50 each, 35¢
 Domestic Fluter.....each, \$1.50
 Eagle, 8 1/2 inch Rolls, \$2.15.....35¢
 Eagle, 5 1/2 inch Rolls, \$2.35.....35¢
 Geneva Hand Fluter, White Metal.....\$11.00
 Knox, 4 1/2 inch Rolls.....\$3.25 each, 25¢
 Knox, 6 inch Rolls.....\$3.60 each, 35¢
 Shepard Hand Fluter, No. 85, per doz.....\$15.50.....40¢
 Shepard Hand Fluter No. 95, per doz.....\$3.00.....40¢
 Shepard Hand Fluter, No. 110, per doz.....\$11.00.....40¢

Hoisting—

Moore's Anti-Friction Differential Pulley Block.....20¢
 Moore's Hand Hoist, with Lock Brake.....20¢
 Moore's Rope Differential Pulley Block.....80¢
 Maris & Beekley (Teal Patent).....30¢
 See also Blocks.

Washing—

Fair and Square.....\$2.00
 Anthony Wayne, per doz, No. 1, \$42; No. 2, \$36; No. 3, \$42.....\$2.00
 Wayne American.....\$2.00
 Western Star, per doz, No. 2, \$36; No. 3, \$39.....\$2.00

Mallets—

B. & L. Block Co., Hickory & L. V. 30¢10¢40¢
 Vibre Head, Stearns.....33¢4¢
 Hickory.....20¢10¢20¢10¢10¢
 Lignumvita.....20¢10¢20¢10¢10¢

Mattocks—Regular list.

60¢10¢60¢10¢25¢
Measures—
 standard Fibreware, No. 1, peck \$2.00, \$3.50; 1/2 peck, \$3.90

Meat Cutters—

See Cutters, Meat.

Menders, Harness—

Per doz.....\$2.00

Milk Cans—See Cans, Milk.

Mills—Coffee—

Box and Side, list Jan. 1, 1888.....60¢60¢5¢
 Net prices are often made which are lower than above discount.
 American Enterprise Mfg. Co., list Jan. 17, 1893.....20¢
 National List, Jan. 1, 1894.....30¢
 Swift, Lane Bros.....30¢
 Wadell's New Box Mills, Ideal Brand, New List.....60¢

Mincing Knives—

See Knives, Mincing.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Highest 10 in. 12 in. 14 in.
 grade \$4.00 \$5.25 \$4.50 \$6.00 \$5.00 \$6.75
 Good \$3.00 \$3.25 \$3.50
 Cheap.....2.25 2.50 2.75

Muzzles—

Safety.....\$2.00, \$3.00, 25¢

Nails—

Cut and Wire. See Trade Report.
 Wire Nails, Papered.
 Association list, May 1, '92.....\$5¢10¢
 55¢10¢5¢
 Tack Mrs. list.....75¢75¢10¢
 Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos. 6 7 8 9 10
 A. C.....25¢ 23¢ 22¢ 21¢ 21¢
 American.....9¢ 9¢ 9¢ 9¢ 9¢
 Anchor.....23¢ 21¢ 20¢ 19¢ 18¢
 Ausable.....28¢ 26¢ 25¢ 24¢ 23¢
 Capewell.....19¢ 18¢ 17¢ 16¢ 15¢
 C. B. K.....25¢ 23¢ 22¢ 21¢ 21¢
 Champion.....25¢ 23¢ 22¢ 21¢ 20¢
 Champlain.....28¢ 26¢ 25¢ 24¢ 23¢
 Clinton, Fin.....19¢ 17¢ 16¢ 15¢ 14¢
 Empire Bronzed.....10¢10¢
 Essex.....28¢ 26¢ 25¢ 24¢ 23¢
 Lyra.....9¢ 9¢ 9¢ 9¢ 9¢
 Maud S.....25¢ 23¢ 22¢ 21¢ 21¢
 Northwest'n.....25¢ 23¢ 22¢ 21¢ 20¢
 Putnam.....23¢ 21¢ 20¢ 19¢ 18¢
 Snowden.....9¢ 9¢ 9¢ 9¢ 9¢
 Standard.....23¢ 21¢ 20¢ 19¢ 18¢
 Vulcan.....23¢ 21¢ 20¢ 19¢ 18¢
 Western.....23¢ 21¢ 20¢ 19¢ 18¢

Picture—

Brass Head, Combination list.....50¢10¢
 Brass Head, Sargent's list.....60¢60¢10¢
 Porcelain Head, Combination list.....40¢10¢
 Porcelain Head, Sargent's list.....50¢10¢10¢
 Niles' Patent.....40¢
 Nail Pullers—See Pullers, Nail.
 Nail Sets—See Sets, Nail.
 Nut Crackers—
 See Crackers, Nut.
 Nuts—List Dec. 18, 1889.
 Square. Hex.
 Cold Punched.....5.00¢ 5.10¢ off list
 Hot Pressed.....5.80¢ 6.50¢ off list
 In packages of 100 lb, add 1-10¢ lb, net; in packages less than 100 lb, add 1/2¢ lb, net.

Oakum—

Best or Government.....\$2.00, \$1.75, \$1.50
 Navy.....\$2.00, \$1.75, \$1.50
 U. S. Navy.....\$2.00, \$1.75, \$1.50

Oil Tanks—See Tanks, Oil.

Oilers—

Brass and Copper.....50¢10¢50¢10¢5¢
 Zinc and Tin.....70¢70¢10¢
 Broughton's Brass.....50¢
 Broughton's Zinc.....50¢
 Malleable, Hammers' Improved No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40, per doz.....10¢10¢5¢
 Malleable, Hammers' Old Pattern, same.....45¢
 Olmstead's Brass and Copper.....60¢
 Olmstead's Tin and Zinc.....60¢
 Prior's Pat. or "Paragon" Brass.....50¢
 Prior's Pat. or "Paragon" Zinc.....60¢10¢10¢
 Steel, Draper & Williams.....50¢
 Whitmot & Hobbs Mfg. Co., Steel Anti-Rust.....60¢

Openers, Can—

American.....\$2.00, \$1.75, \$1.50
 Champion, per doz \$2.00.....50¢
 Domestic, per doz \$2.00.....45¢
 Duplex.....per doz 25¢, 15¢20¢
 Eureka.....per doz \$2.50, 10¢
 Excelsior, No. 1 \$2.50; No. 2, \$1.50.....40¢
 French, No. 4.....per doz \$2.25, 55¢60¢
 No. Handle, No. 5.....per doz \$2.25, 45¢50¢
 Lyman's.....per doz \$3.75, 20¢
 Messenger's Comet.....per doz \$3.00, 25¢
 Moore's.....70¢
 Sardine Scissors.....per doz \$2.75, \$3.00
 Sprague, No. 1, 55¢; 2, 60¢; 3, 65¢
 Star.....per doz \$3.00, 55¢25¢
 Universal, per doz \$3.00, 55¢25¢
 World's Best, per gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00.....50¢10¢

Packing, Steam—

Rubber—

Standard, fair quality.....70¢70¢10¢
 Inferior quality.....75¢80¢
 Extra.....80¢90¢5¢
 Jenkins' Standard, per doz \$8.00.....25¢25¢5¢
 N. Y. B. & P. Co., Empire.....80¢
 N. Y. B. & P. Co., Salamander.....25¢
 N. Y. B. & P. Co., Standard.....50¢
Miscellaneous
 American Packing.....10¢11¢
 Cotton Packing.....15¢17¢
 Italian Packing.....15¢14¢
 ute.....70¢80¢
 Russia Packing.....14¢

Pails—

S. S. & Co.: 18-qt., \$7.00; 20-qt., \$7.25
 \$ doz.....5¢

Galvanized—

Quarts 10 12 14
 Central Stamping Co.....2.50 2.75 3.00
 Fire Buckets.....2.75 3.25 3.50
 Hill's Heavy Weight, \$ doz.....3.00 3.25 3.75
 Hill's Light Weight, \$ doz.....2.75 3.00 3.25
 Iron Clad.....2.50 2.75 3.00
 Sidney Shepard & Co.....2.50 2.75 3.00
 Buckets—See Buckets, Well.

Indurated Fiber Ware

Fire Pails, deep.....\$2.40
 Fire Pails, round bottom.....\$2.40
 Milk, 14 qt.....\$2.40
 Stabls.....\$2.40
 Star Pails, 12 qt.....\$2.40

Standard Fiber Ware—

Buggy Pails.....\$3.00, Dec'd
 Chamber Pails, 14 qt.....6.00 \$7.00
 Dairy Pails, 14 qt, \$ doz.....3.75 4.25
 Fire Pails, No. 1, 12 qt, \$ doz.....3.75
 Fire Pails, No. 2, 14 qt, \$ doz.....4.25
 Horse Pails.....4.00
 Slop Jars (Gal. trap).....7.50 8.50
 Sugar Pails.....5.00 5.50
 Water Pails, 12 qt, \$ doz.....3.15 3.75

Pans—Dripping—

Large sizes.....\$2.00, \$2.50
 Small sizes.....\$2.00, \$2.50
 Silver & Co. (Covered).....40¢

Fry—

Standard List:
 No.....1 2 3 4
 \$ doz.....\$3.00 \$3.75 \$4.25 \$4.75 \$5.25
 No.....5 6 7 8
 \$ doz.....\$6.00 \$7.00 \$8.00 \$9.00
 Polished, regular goods.....75¢75¢10¢
 Acme Fry Pans.....60¢4¢

Dust—

Steel Edge, No. 1.....\$2.00, \$1.75

Roasting and Baking—

Columbian, S. S. & Co.: Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each.....60¢10¢

Paper and Cloth—

Sand and Emery—
 List April 19, 1888.....50¢10¢60¢
 Sibley's Emery and Crocus Cloth.....30¢

Parers—

Apple—

Advance.....\$2.00, \$1.75
 Baldwin.....\$2.00, \$1.75
 Bonanza.....each 5.00
 Dandy.....each 7.50
 Eclipse.....each 4.00
 Euphrate.....each 16.00
 Family Bay State.....\$2.00, \$1.75
 Favorite.....\$2.00, \$1.75
 Gold Medal.....\$2.00, \$1.75
 Ideal.....\$2.00, \$1.75
 Improved Bay State.....\$2.00, \$1.75
 Little Star.....\$2.00, \$1.75
 Reading 73.....\$2.00, \$1.75
 New Lightning.....\$2.00, \$1.75
 Oriole.....\$2.00, \$1.75
 Penn.....\$2.00, \$1.75
 Perfection.....\$2.00, \$1.75
 Pomona.....\$2.00, \$1.75
 Reading 72.....\$2.00, \$1.75
 Reading 73.....\$2.00, \$1.75
 Rocking Table.....\$2.00, \$1.75
 Turn Table.....\$2.00, \$1.75
 Victor.....\$2.00, \$1.75
 Waverly.....\$2.00, \$1.75
 White Mountain.....\$2.00, \$1.75

Potato—

Antrim Combination.....\$2.00, \$1.75
 Hoosier.....\$2.00, \$1.75
 Saratoga.....\$2.00, \$1.75
 White Mountain.....\$2.00, \$1.75

Pencils, Soapstone—

See Crayons.

Pickers, Fruit—

Prize Fruit Pickers.....50¢

Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00.....60¢10¢5¢60¢10¢10¢5¢

Picture Nails—

See Nails, Picture.

Pinking Irons—

See Irons, Pinking.

Pins—

Bow—

Humason, Beekley & Co.'s.....60¢10¢
 Peck, Stow & W. Co.....50¢10¢50¢10¢5¢
 Sargent & Co.'s, list Nov. 18.....60¢10¢

Escutcheon—

Brass.....70¢
 Iron, list Nov. 11, 1885.....75¢

Pipe, Wrought Iron—

1 1/2 and under, Plain.....57¢10¢10¢10¢
 1 1/2 and under, Galv.....50¢10¢10¢10¢
 1 1/2 and over, Plain.....67¢10¢10¢10¢
 1 1/2 and over, Galv.....57¢10¢10¢10¢
 Boiler Tubes, list Oct. 24, 1892.....65¢10¢10¢10¢
 Casing, list Nov. 16, 1892.....52¢10¢10¢10¢
 Cold Water Seamless Steel Tubing.....60¢
 Inserted Joints, Casing, list Nov. 18, 1892.....47¢10¢10¢10¢
 Steel Boiler Tubes.....27¢10¢10¢10¢

Planes and Plane Irons—

Wood Planes—

Molding.....40¢10¢50¢
 Bench, First quality.....50¢10¢55¢
 Bench, Second quality.....50¢10¢60¢5¢
 Bailey's (Stanley R. & L. Co.).....50¢10¢
 Bailey's (Stanley R. & L. Co.).....50¢10¢
 Birmingham Plane Co.....60¢60¢5¢
 Chapin's Iron Planes.....50¢50¢5¢
 David's Iron Planes.....50¢50¢5¢
 Gage Tool Co.'s Self-Setting.....50¢50¢5¢
 Meriden Mal. Iron Co.'s.....50¢50¢5¢
 Miscellaneous Planes (Stanley R. & L. Co.).....25¢10¢
 Sargent's.....60¢10¢10¢
 Standard Tool Co.....60¢10¢10¢
 Stearns' Iron Planes.....50¢50¢5¢

Plane Irons—

Auburn Thistle.....30¢10¢30¢10¢10¢
 Buck Bros.....30¢10¢30¢10¢10¢
 Rutherford's.....\$5.00, \$5.25 to \$5
 Ohio.....30¢10¢30¢10¢10¢
 Sandusky.....30¢10¢30¢10¢10¢

Stanley R. & L. Co.....50¢10¢
 L. & I. J. White.....50¢

Plates—

Felloe.....\$2.00, \$1.75

Pliers and Nippers—

Button's Patent.....60¢
 Carey's Pat. Wire Cutters.....20¢
 Cronk's 5 in., \$15.00; 10 in.....\$20
 Cronk's Button Pattern.....50¢10¢50¢
 Cronk's Carrier Pliers.....60¢60¢5¢
 Eureka Pliers and Nippers.....40¢
 Gas Pliers.....40¢
 Gas Pliers, Cushman's Nickel Plated.....50¢
 Hall's No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00, per doz.....40¢
 Humason & Beekley Mfg. Co. 50¢50¢10¢
 Lindsay's Giant.....38¢4¢
 Morrill's Parallel, \$ doz.....\$12.00.....30¢25¢
 P. S. & W. Cast Steel.....50¢50¢5¢
 P. S. & W. Tinnars' Cutting Nippers.....10¢
 add 6¢
 Russell's Parallel.....25¢

Plumbs and Levels—

Regular list.....75¢10¢75¢10¢10¢
 Cook's.....40¢10¢
 Davis inclinometers.....40¢10¢
 Davis Iron Levels.....80¢
 Diston's.....50¢
 Pocket Levels.....70¢10¢70¢10¢10¢
 Stanley's Duplex.....20¢10¢
 Stanley's Handy.....20¢10¢

Poachers, Egg—

Buffalo Steam Egg Poachers, \$ doz.
 No. 1, \$6.00; No. 2, \$9.00.....33¢4¢
 Silver & Co., 6-Ring, \$ doz, \$4.00; 3-Ring.....\$2.00

Pokes, Animal—

Bishop's American.....\$2.00, \$1.75
 Bishop's A. L. L.....\$2.00, \$1.75
 Bishop's Steel Monarch.....\$2.00, \$1.75
 Bishop's Steel.....\$2.00, \$1.75
 Bishop's Pioneer.....\$2.00, \$1.75
 Bolding.....\$2.00, \$1.75
 Buckley, Single Stale.....\$2.00, \$1.75
 Eagle, Double Stale.....\$2.00, \$1.75
 Eagle, Single Stale.....\$2.00, \$1.75
 Metallic Horse Poke.....\$2.00, \$1.75

Police Goods—

Daley's Improved Handcuffs, 2 Hands, Polished, \$ doz, \$43.00; Nickleled, \$57.00; 3 hands, Polished, \$ doz, \$72.00; Nickleled, \$84.00.....25¢
 J. P. Lovell's Police Goods.....25¢
 Newhall Ship Chandlery Co., Handcuffs, \$15.00 \$ doz.....25¢
 Towers's.....25¢

Polish—

Metal—

Gaston's Silver Compound.....33¢4¢
 Restolite.....50¢
 Restolite Silver.....33¢4¢
 Tanite Mills:
 Paste, 1/4 lb tins.....\$1.40, 40¢
 Paste, 1 lb tins.....\$3.00, 60¢
 Liquid, 1/2 pint.....\$3.00, 60¢
 Powder, 1 lb.....\$3.00, 60¢

Stove—

Black Eagle Benzine Paste, 5 and 10 lb cans.....\$2.00, \$1.75
 Black Flag.....\$2.00, \$1.75
 Black Flag, 5 and 10 lb pails.....\$2.00

Pullers Nail-

Beltpipe..... * doz., \$24.00, 40¢
 Economy..... * doz., \$40.00
 Giant, No. 1..... * doz., \$15.00, 10¢
 Giant, No. 2..... * doz., \$15.00, 10¢
 Pelican..... * doz., \$9.25, 25¢
 Seranton..... * doz., \$15.00, 35¢

Pulleys-

Brass Screw..... 70¢
 Hay Fork, "Anti-Friction," 5 in. solid, \$5.70..... 50¢
 Hay Fork, "F" Common and Patent Bushed..... 20¢
 Hay Fork, Moore's Anti-Friction 5 in. Wheel, * doz., \$12.00..... 40¢
 Hay Fork, Reed's Self-Lubricating..... 60¢
 Hay Fork, Solid Eye, \$4.00; Swivel, \$4.50..... 50¢
 Hay Fork, Stearns' Nos. 35 & 45..... 50¢
 Hay Fork, Stearns' Nos. 15, 25, 50, 60, 80..... 20¢
 Hay Fork, Tarbox Pat. Iron..... 20¢
 Hay House, Lumbering..... 60¢
 Japanned Clothes Line..... 60¢
 Japanned Side..... 70¢
 Japanned Sewer..... 70¢
 Japanned Side..... 70¢
 Moore's Ceiling or End, Anti-Friction..... 40¢
 Moore's Dumb Waiter, Anti-Friction..... 30¢
 Moore's Electric Light..... 30¢
 Moore's Side, Anti-Friction..... 50¢
 Nash (Auger Mortise)..... 60¢
 Common Sense..... 60¢
 Empire..... 60¢
 Acme..... 60¢
 Ideal, Nos. 2, 4, 10 & 15..... 60¢ less 1¢
 Star..... 25¢
 Ideal, Nos. 25 & 55..... * doz. 22¢ net.
 On bbl. lots extra 5¢.
 Shade Rack..... 45¢
 Sheppard's Niagara, No. 25..... * doz. 23¢ net
 Tackle Blocks-See Blocks.

Pumps-

Cistern, Best Makers..... 60¢
 Pitcher Spout, Best Makers..... 60¢
 Pitcher Spout, Cheaper G'ds..... 75¢
 Myers' Pumps, low list..... 50¢

Punches-

Avery's Revolving..... 25¢
 Avery's Sawset and Punch-See Sawsets
 Bemis & Call Co.'s Cast Steel Drive..... 60¢
 Bemis & Call Co.'s Check..... 55¢
 Bemis & Call Co.'s Spring..... 60¢
 Bemis & Call Co.'s Springfield Socket..... 65¢
 Niagara Hollow Punches..... 20¢
 Niagara Solid Punches..... 55¢
 Rice Hand Punches..... 15¢
 Saddler's or Drive, good..... * doz., 60¢
 Spring, good quality..... * doz., \$2.50
 Spring, Leach's Pat..... 15¢
 Solid Tinnings, P., S. & W. Co., * doz., \$1.44..... 55¢
 Tinnings' Hollow Punches, P., S. & W. Co., * doz., 20¢

Rail-

Barn Door, Light, In. 1/4 * 3/4 * 1/2
 Per 100 feet..... \$2.00 2.50 3.10, 10¢
 B. D. for N. E. Hangers.....
 Small, Med. Large.....
 Per 100 feet..... \$3.10 2.75 2.40
 Carrier, double braced, Steel Rail, * foot..... 3¢
 Lundy Parlor Door, Planed Edge, * ft., 7¢
 Moody Steel Rail * ft., 5¢..... 45¢
 Moore's Steel Rail..... 25¢
 Sliding Door, Bronzed Wt Iron, * ft., 7¢
 Sliding Door, Iron, Painted, * ft., 4¢
 Sliding Door, Wt. Iron, * ft., 4¢, 4¢
 Terry's Steel Rail..... * ft., 4¢
 Victor Track Rail, 7¢ * foot..... 50¢

Rakes-

Rake Steel, Association r'ds..... 70¢
 Cast Steel, outside g'ds..... 70¢
 Malleable..... 70¢
 Fort Madison Prize Bow Brace and Peerless..... 65¢
 Fort Madison Steel Tooth Lawn Rake..... \$6.00
 Gibbs..... * doz., \$4.90
 Gibbs' Acme Lawn Rake..... * doz., \$4.75
 Gibbs' Canton Lawn Rake..... * doz., \$3.75
 Gibbs' Crown Lawn Rake, No. 1..... * doz., \$4.90
 Gibbs' Favorite Lawn Rake..... * doz., \$4.90
 Gibbs' Hustler No. 0..... * doz., \$4.25
 Gibbs' Hustler No. 1..... * doz., \$4.40
 Oneida Lawn Rake..... * doz., \$6.00

Razors-

Campbell Cutlery Co..... 50¢
 Electric Cutlery Co..... Net prices
 Galvanic..... * doz., \$15.00
 Jordan's AAA1, new list..... Net prices
 Jordan's Old Faithful, new list..... Net prices
 J. R. Torrey Razor Co..... Net prices
 Wostenholm and Butcher, \$10 to 2..... 10¢

Razor Straps-

See Straps, Razor.

Reels, Clothes Line-

Stearns..... 33¢
 Moore's Bronze Finishes..... 70¢
 Moore's Electroplated..... 75¢
 Moore's Japanese..... 75¢
 Moore's Solid Bronze..... 85¢
 Moore's Stove Pipe..... 33¢

Rings and Ringers-

Bull Rings-
 Elrich Edw. Co., White Metal, low list..... 50¢
 Hotchkiss' low list..... 30¢
 Humason, Beckley & Co.'s..... 70¢
 Peck, Stow & W. Co.'s..... 50¢
 Sargent's..... 75¢
 Union Nut Co..... 80¢
Hog Rings and Ringers-
 Blair's Hog Rings..... * doz. \$2.00
 Blair's Hog Rings..... * doz. \$2.00
 Brown's Rings..... * doz. \$2.00
 Brown's Rings..... * doz. \$1.15
 Champion Rings..... * doz. \$2.00
 Champion Rings..... * doz. \$2.00
 Electric Hog Rings..... * doz. \$2.00
 Hill's Improved Rings..... * doz. \$1.25
 Hill's Old Style Rings..... * doz. \$1.25
 Hill's Rings..... * doz. \$1.00
 Hill's Rings..... * doz. \$1.00
 Major Rings..... * doz. \$1.25
 Perfect Rings..... * doz. \$2.15
 Perfect Rings..... * doz. \$1.50
 Top of the Hill Rings..... * doz. \$1.25
Rivets and Burrs-
 Copper..... 60¢
 Iron Norway, list No. 17, '87..... 60¢
 Second quality..... 70¢

Rivet Sets-See Sets.**Roasting and Baking Pans-See Pans, Roasting and Baking.****Rods-**

Star, Black Walnut..... * doz. 40¢
 Star, Brass..... 25¢

Rollers-

Acme Moore's Anti-Friction..... 55¢
 Barn Door, Sargent's list..... 60¢
 Moore's Barn Door Stay..... 50¢
 Union Barn Door Roller..... 70¢
 Thompson Mfr. Co.'s Lawn Rollers..... 30¢

Rope-

The following prices are f.o.b. New York or factory, and are shaded 1/4¢ on large lots; terms 1 1/2% for cash.
 Manila, 7-16 in. diam. and larger..... 6 1/2¢
 Manila, 1/4 and 5-16 in. diam..... 7 1/2¢
 Manila, Tarrad Rope..... 6 1/2¢
 Manila, Hay Rope, Med'm..... 6 1/2¢
 Sisal, 7-16 in. and larger..... 4 1/2¢
 Sisal, 1/4 and 5-16 in. diam..... 5 1/2¢
 Sisal, Hay Rope..... 4 1/2¢
 Sisal Tarrad Rope..... 4 1/2¢
 Sisal Medium Lath Yarn..... 4 1/2¢
 New Zealand..... 7-16 in. and larger..... 4 1/2¢
 New Zealand, 1/4 inch..... 5 1/2¢
 New Zealand, 1/4 and 5-16 in. diam..... 5 1/2¢
 New Zealand, Hay Rope..... 4 1/2¢
 New Zealand, Tarrad Rope..... 4 1/2¢
 Cotton Rope..... * doz. 13¢
 Jute Rope..... * doz. 6¢

Wire-

List February, 1892. All kinds. 50¢ to 50¢ 5/8

Rules-

Boxwood..... 80¢
 Ivory..... 50¢
 Starrett's Steel Rules and Straight Edges..... 25¢

Sad Irons-See Irons, Sad.**Sand and Emery Paper and Cloth-See Paper and Cloth.****Sash Cord-See Cord, Sash.****Sash Locks-See Locks, Sash.****Sash Weights-See Weights, Sash.****Sausage Stuffers or Fillers-See Stuffers or Fillers, Sausage.****Saws-**

Note-Extra 5¢ to 10¢ often given.

Atkins' Circular..... 50¢
 Atkins' Circular Saw..... 40¢
 Atkins' Circular Saw..... 50¢
 Atkins' One-Man Saw..... 40¢
 Atkins' Wood Saws..... 40¢
 Diston's Circular..... 45¢
 Diston's Cross Cut, list Jan. 1, '93..... 40¢
 Diston's Hand..... 25¢
 E. Jennings & Co.'s..... 45¢
 Peace Cross Cut, list Jan. 1, '93..... 45¢
 Peace Hand, Panel and Rip..... 25¢
 Richardson's Circular and Mill..... 45¢
 Richardson's X Cut, list Jan. 1, '93..... 45¢
 Simonds' Circular Saws..... 45¢
 Simonds' Crescent Ground Cross Cut Saws..... 30¢
 Simonds' Gang, Mill, Mulay and Drag Saws..... 45¢
 Wheeler, Madden & Clemson Mfg. Co. Cross Cuts, list Jan. 1, 1893..... 45¢
 Hand, Panel and Rip..... 30¢
 Woodrigh & McFarlin..... 45¢
 Cross Cuts, list Jan. 1, 1893..... 45¢
 Hand, Panel and Rip..... 25¢

Hack Saws-

Eureka and Crescent..... 25¢
 Griffin's Hack Saw Blades..... 40¢
 Star Hack Saws and Blades..... 25¢

Scroll-

Barnes' Builders' and Cab Makers'..... 15¢
 Barnes' Scroll Saw Blades..... 35¢
 Rogers, complete..... 10.00
 Rogers, complete, \$4.00..... 25¢

Saw Frames-See Frames, Saw.**Saw Sets-See Sets, Saw.****Saw Tools-See Tools, Saw.****Scales-**

Chatillon's Eureka..... 25¢
 Chatillon's Favorite..... 40¢
 Chatillon's Grocers' Trip Scales..... 50¢
 Family, Turnbills..... 30¢
 Hatch, Counter, No. 1..... * doz. \$18.00
 Hatch, Tes, No. 181..... * doz. \$6.50
 Riehle Bros' Platform..... 40¢
 Union Platform, Plain..... \$2.10
 Union Platform, Striped..... \$2.40

Scale Beams-See Beams, Scale.**Scissors, Fluting..... 45¢****Scraper-**

Adjustable Box Scraper (S. R. & L. Co.)..... \$8.00
 Box, 1 Handle..... * doz. \$2.00
 Box, 2 Handles..... * doz. \$3.00
 Defence Box and Ship..... 20¢
 Foot..... 50¢
 Ship, Common..... * doz. \$8.50
 Ship, R. I. Tool Co..... 10¢

Screen Window and Door Frames-See Frames**Screw Drivers-**

See Drivers, Screw

Screws-

Bench and Hand-
 Bench, Iron..... 55¢
 Bench, Wood, Hickory..... 20¢
 Hand, Wood..... 25¢
 Hand, Grand Rapids, list..... 35¢

Coach, Lag and Hand-Rail-

Lag, Blunt Point, list Jan. 1, 1890..... 80¢
 Coach and Lag, Gimlet Point, list Jan. 1, 1890..... 80¢
 Hand Rail, Iron Screw Co..... 75¢
 Hand Rail, H. & B. Mfg. Co..... 70¢
 Hand Rail, Sargent's..... 70¢

Jack Screws-

Millers Fall..... 50¢
 Millers Falls, Roller..... 50¢
 P. S. & W..... 70¢
 Sargent's..... 40¢

Cork-

Detroit Cork Screw Co..... 85¢
 Humason & Beckley Mfg. Co..... 40¢
 Williamson's Forged Worm, Applewood Handle, * doz., \$5.00; Rosewood, \$5.50..... 40¢

Machine-

Flat Head Iron..... 70¢
 Round Head Iron..... 65¢

Wood-

List January 1, 1891
 Flat Head Iron..... 80¢
 Round Head Iron..... 75¢
 Flat Head Brass..... 80¢
 Round Head Brass..... 75¢
 Flat Head Bronze..... 80¢
 Round Head, Bronze..... 75¢
 Rogers' Drive Screws..... 82¢

Scroll Saws-See Saws, Scroll.**Scythes-**

Grain..... 40¢
 Grass..... 40¢

Scythe Snaths-See Snaths, Scythe.**Sets-****Awl and Tool-**

Alken's Sets, Awls and Tools..... No. 20, * doz. \$10.00..... 60¢
 Common Sets..... No. 42, \$10.50; No. 43, \$12.50..... 70¢
 Fray's Adj. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9..... 45¢
 Henry's Combination Haft..... * doz. \$6.50
 Millers Falls Adj. Tool Hds., No. 1, \$12; No. 4, \$12; No. 5, \$15..... 25¢
 Stanley's Excelsior..... No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50..... 30¢

Nail-

Round..... * gr. \$3.25
 Square..... * gr. \$4.00
 Buck Bros..... 27¢
 Cannon's Diamond Point..... * gr. \$12, 20¢

Rivet-

Regular list..... 70¢

Saw-

Atkins' Criterion..... * doz. No. 1, \$6.00
 Alken's Genuine..... \$13.00, 50¢ to 60¢
 Alken's Imitation..... * doz. \$3.00 to \$3.25
 Atkins' Lever..... * doz. No. 1, \$6.00
 Avery's Saw Set and Punch..... 50¢
 Bemis & Call Co.'s Cross Cut..... 30¢
 Bemis & Call Co.'s Plate..... 30¢
 Bemis & Call Spring Hammer..... 30¢
 Common Lever..... * doz. \$2.00, 45¢ to 50¢
 Crescent..... * doz. \$3.00
 Crosscut (Keller), No. 1, \$15.00; No. 2, \$24.00..... 40¢
 Diston's Star..... 25¢
 Hammer, Bemis & Call Co.'s new Pat. 10¢
 Hammer, Hotchkiss..... \$5.50, 10¢
 Hart's Pat. Lever..... 20¢
 Kohler's Patent Royal..... * doz. \$12.00
 Kohler's Royal..... * doz. \$7.00
 Leach's, No. 0, \$3.00; No. 1, \$15..... 15¢
 Leopold..... 40¢
 Morrill's No. 1, \$15.00..... 40¢
 Nos. 3 and 4, Cross Cut, \$23.00..... 40¢
 No. 5, Mill, \$31.00..... 40¢
 No. 10, \$15.50..... 40¢
 No. 11, \$16.00..... 40¢
 Nash's..... 20¢
 Smailman's Genuine..... * doz. \$5.50 to \$6.00
 Stillman's Pattern, Hand, * doz. \$3.25
 Cross Cut, \$6.50..... 55¢
 Taintor Positive..... * doz. \$18, 50¢

Sharpeners, Knife-

Parkin's..... Appletwood Handles..... * doz. \$6.00, 50¢
 Rosewood or Corbols..... * doz. \$2.00, 50¢
 Taintor Mills..... * gr. \$14.40..... 25¢

Shaves, Spoke-

Iron..... 45¢
 Bailey's (Stanley R. & L. Co.)..... 50¢
 Cincinnati..... 25¢
 Goodell's * doz. \$9.00..... 25¢
 Stearns..... 40¢

Shears-

Acme Cast Shears..... 10¢
 American Cast Iron..... 75¢
 Barnard's Lam. Trimmers..... 50¢
 Cast Steel Trimmers..... 50¢
 First quality..... 80¢
 Second quality..... 80¢
 Campbell Cutlery Co., Jap'a..... 75¢
 Nickel Plated..... 60¢
 Clauss brand, Japanned..... 70¢
 Clauss brand, Nickel, same list..... 60¢
 Clippel..... 10¢
 Davenport Cutlery Co..... 60¢
 Diamond Cast Shears..... 10¢
 Electric Cutlery Co..... Net
 Galvanic 3/4 to 9 in. * doz. \$1.00 * inch
 Hatch Cutlery Co. Solid Steel Forged, 60¢
 Heinisch's, list..... 80¢
 Heinisch's, 80¢
 Heinisch's Tailor's Shears..... 35¢
 Howe Bros. & Hubert, Solid Forged Steel..... 40¢
 Seymour's, list Dec. 1881..... 50¢
 Victor Cast Shears..... 75¢
 Tinnings' Snips..... 40¢
 Cast Handles, Laid with Steel..... 40¢
 Niagara Snips and Shears..... 20¢
 Wrt. Handles, Steel Blades..... 120¢

Pruning Shears and Hook

Diston's Combined Pruning Hook and Saw..... * doz. \$18.00, 20¢
 Diston's Pruning Hook..... * doz. \$12.00, 20¢
 Dunlap's Saw and Chisel, * doz. \$3.50, 35¢
 Henry's Pruning Shears..... * doz. \$2.25, 20¢
 E. S. Lee & Co.'s Pruning Tools..... 50¢
 Levin Pruner No. 1, \$15.00 * doz. 40¢
 Levin Pruner No. 2, \$21.00 * doz. 40¢
 J. Mallinson & Co., No. 1, \$5.25; No. 2, \$7.25
 Pruning Shears, Henry's Pat. * doz. \$3.50 to \$4.00
 P. S. & W. Co..... 60¢
 Wheeler, M. & C. Co., Combination..... * doz. \$12.00

Tinners', &c.-

Shears and Snips (P. S. & W.)..... 20¢
 Snips, J. Mallinson & Co..... 35¢

Sheaves-**Sliding Door-**

Corbin's list..... 60¢
 M. W. Co., list July 1888..... 50¢
 Moore's Anti-Friction..... 50¢
 Patent Roller..... 60¢
 Patent Roller, Hatfield's..... 75¢
 R. & E., list Dec. 13, 1885..... 55¢
 Russell's Anti-Friction, list Dec. 13, 1885..... 60¢

Sliding Shutter-

Reading list..... 60¢
 R. & E., list Dec. 13, 1885..... 60¢
 Sargent's list..... 70¢

Shells-

Brass Shot Shells, Club, Rival, Climax..... 65¢
 First quality 4, 8, 10 and 12..... 60¢
 First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (\$7.50 list)..... 20¢
 Prize..... 40¢
 Smokeless brand, 12, 10, 16 gauge..... 40¢
 Star, Club, Rival and Climax Brands..... 35¢
 Trap brand, 12 and 10 gauge..... 35¢
 Shells, Loaded-Standard list, July 19, 1890..... 40¢
 2¢ cash, 10 days.

Ship Tools-

L. & I. J. White..... 20¢

Shoes, Horse, Mule, &c.**Horse-**

Burden's, Perkins, Noemix, Standard, Diamond State, Bryden's Rose and Crescent..... \$3.50 to \$4.00
 Bryden's Frog Pressure, at factory..... \$5.00

Mule-

Add \$1 * keg to above prices.

Ox Wrought-

1000 lb lots..... * doz. \$9
 500 lb lots..... * doz. \$10

Shot-

Drop, up to B, 25-b bag..... \$1.15
 Drop, B and larger, 25-b bag..... 1.40
 Drop, B and larger, 5-b bag..... 1.40
 Buck and Chilled, 25-b bag..... 1.40
 Buck and Chilled, 5-b bag..... 2.00
 Dust Shot, 25-b bag..... 2.00
 Dust Shot 5-b bag..... 45¢

Shovels and Spades-

Ames' Shovels, Spades, &c., list Nov. 1, 1885 (Except Nos. named below)..... 20¢
 The following Nos. are subject to a discount of 25¢: Nos. 54, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382,

Snap s, Harness, &c.

Anchor 1, & S. Mfg. Co.,	50%
Andrews,	50%
Cover's Saddlery Works' Triumph,	50%
Covered Spring,	50%
Covert, New Patent,	50%
Covert, New R. E.,	50%
Fitch's (Bristol),	50%
German, new list,	50%
Hotchkiss,	50%
Kelley & Woolworth's Steel Harness,	50%
John Prots Snaps,	50%
Sargent's Patent Guarded,	50%

Snaths—

Scythe	50%
--------	-----

Soldering Irons—

See *Irons, Soldering.*

Spittoons, Cuspidors, &c.

Standard Fiberglass—
Cuspidors, 3/4 inch, 1/2 doz., No. 5, 3; No. 5X, 3.

Spittoons, Daisy, 8-inch, No. 1, 1 10 and 11 inch, 3.

Spoke Shaves—

See *Shaves, Spoke.*

Spoke Trimmers—

See *Trimmers, Spoke.*

Spoons and Forks—

Tinned Iron—
Basting, Cen. Stamp, Co.'s list, 70% 10%

Buffalo, S. S. & Co., 33% 25%

Solid Table and Tea, Cen. Stamp, Co.'s list, 70% 10%

Silver Plated—

4 months or 55 cash 30 days:

L. Boardman & Son, 50% 12%

Holmes & Edwards Silver Co., 40, 15%

Meriden Brit. Co., Rogers, 40% 40%

Reed & Barton, 40% 40%

Rogers & Bros, 40% 40%

O. Rogers & Bros, 40% 40%

Rogers & Hamilton, 40% 40%

Wm. Rogers Mfg. Co., 40, 15%

Simpson, Hall, Miller & Co., 40, 15%

Miscellaneous—

Boardman's Britannia Spoons, case lots, 60% 5% cash

Boardman's Nickel Silver, list July 1, 1891, 60% 5% cash

Britannia, 60% 5% cash

German Silver, 50% 5% cash

Nickel Silver, 50% 5% cash

Holmes & Edwards Silver Co., No. 24 German Silver, 50% 10% 5%

No. 30 Silver Metal, 50% 10% 5%

No. 49 Nickel Silver, 50% 10% 5%

No. 60 Nickel Silver, 50% 5%

No. 67 Mexican Silver, 50% 10% 5%

Rogers & Hamilton, 40% 15% 5%

Cimetar, Flatware, 40% 15% 5%

Cimetar, Steel, 40% 15% 5%

Crown Hamilton, Flatware and Cutlery, 30%

Steel Goods, 40% 10%

Wm. Rogers Mfg. Co., 18% Rogers' German Silver, 60% 8%

22% Rogers' Nickel Silver, 50% 8%

Rogers' Silver Metal, 50% 10% 5%

Spring Doors—

Champion (Coll), 60% 10% 60% 10% 10%

Cowell's, No. 1, 1/2 doz \$18.00; No. 2, \$16.00, 50% 50% 10%

Gem (Coll), list April 19, 1886, 20%

Hercules, 50% 50% 10%

Phenix, 39%

Rubber, complete, 1/2 doz \$4.50, 55% 10%

Star (Coll), list April 19, 1886, 20% 10%

Torrey's Rod, 39 in., 1/2 doz \$12.00, 15%

Warner's No. 1, 1/2 doz \$15.00; No. 2, \$3.40, 55% 55% 10%

Victor (Coll), 60% 10% 60% 10% 5%

Carriage, Wagon, &c.

Elphie, Concord, Platform and Half Scroll, 60% 10% 60% 10% 10% or net prices

Oliver's Rolster Springs, 25%

Sprinklers, Lawn—

Gibbs' Arc, 1/2 doz., \$12.00

Gibbs' Hustler, 1/2 doz., \$6.00

Squares—

Nickel-Plated, 1/2 doz \$1.70, 10% 5%

Steel and Iron, 1/2 doz \$1.70, 10% 5%

Try Square and T Bevels, 60% 10% 10%

Avery's Level Protractor, 50%

Avery's Flush Bevel Squares, 50%

Diston's Try Square and T Bevels, 50%

Starrett's Micrometer Caliper Squares, 25%

Winterbottom's Try and Miter, 30% 10%

Squeezers—

Fodder—
Blair's, 1/2 doz \$2.00

Blair's "Olmaz", 1/2 doz \$1.25

Lemon—

Porcelain Lined, No. 1, 1/2 doz \$6.00, 25% 30%

Wood, Common, 1/2 doz \$1.70, 10% 5%

Wood, No. 2, 1/2 doz \$3.00, 35%

Dean's, No. 1, 1/2 doz \$6.50; 2, \$5.35; 3, \$1.00; Queen, \$2.50

Dunlap's Improved, 1/2 doz \$3.75, 20%

Hotchkiss Straight Flash, 1/2 doz \$12.00

Jennings' Star, 1/2 doz \$2.50

King, 40% 5%

Little Giant, 50% 50% 5%

Sammis, No. 1, \$5.00; No. 2, \$9.12, 25% 10%

11% 3 doz., 25% 10%

Silver & Co., Glass, 1/2 doz \$9.00

The Boss, 1/2 doz \$2.50

Standard Fiber Ware—
See *Ware, Standard Fiber.*

Staples—
Barbed Blind, 1/4 in. and larger, 1/2 doz \$7.75

Barbed Blind, 1/4 in., 1/2 doz \$8.50

Fence Staples, Galvanized, Same price as Barbed Blind

Fence Staples, Plain, See *Trade Rep*

Grand Crossing Tack Co.'s list, 75% 10%

Steels Butchers'—
C. & A. Hoffmann's, 40%

Nichols Bros, 40% 10%

Steelyards—
40% 10% 50%

Stocks and Dies—
Blacksmith's—
Butterfield's Goods, 35%

Waterford Goods, 30%

Gardner, 35%

Green River, 50% 5%

Lightning Screw Plate, 25% 30%

Beece's New Screw Plates, 25% 30%

Reversible Ratchet, 30%

Stone—
Stones, Grind—See *Grindstones.*

Scythe Stones—
Pike Mfg. Co., list April, 1892, 35% 4%

Cleveland Stone Co., list Nov. 1892, 35% 4%

Oil Stones, &c.

Pike Mfg. Co.	
Hindostan No. 1, 1/2 doz \$8	
Sand Stone, 1/2 doz \$40	40%
Turkey Oil Stone, 1/2 doz \$10	10%
Turkey Slips, 1/2 doz \$2.00	
Lily White Washita, 1/2 doz \$60	
Rosy Red Washita, 1/2 doz \$60	
Washita Stone, Extra, 1/2 doz \$60	
Washita Stone, No. 1, 1/2 doz \$60	
Lily White Slips, 1/2 doz \$60	
Rosy Red Slips, 1/2 doz \$60	
Washita Slips, Extra, 1/2 doz \$60	
Washita Slips, No. 1, 1/2 doz \$60	
Arkansas Stone, No. 1, 3 to 5 1/2 in., \$2.80	
Arkansas Stone, No. 1 1/2 to 3 in., \$3.50	
Lake Superior, 1/2 doz \$18	
Lake Superior Slips, 1/2 doz \$20	
Tanite Mills, 1/2 doz \$9.00, 50% 65%	

Stops, Bench—

Cincinnati, 25% 10%	
Crescent, 1/2 doz \$1.50	
Hotchkiss, 1/2 doz \$5.10, 10% 10%	
McGills, 1/2 doz \$3	
Morrill's, 1/2 doz \$11.00; No. 2, \$11.00	
Stearns, 1/2 doz \$4.00	
Terrill's Nos. 1 and 2, 1/2 doz \$3; No. 3, \$4.00	
Weston's, No. 1, \$10.00; No. 2, \$9.25, 10% 5%	

Stove Polish—

See *Polish, Stove.*

Stretchers Carpet—

Cast Iron, Steel Points, 1/2 doz \$75, 80%

Cast Steel, Polished, 1/2 doz \$22.5

Socket, 1/2 doz \$17.5

Bullard's, 25% 25% 10%

Strop Raps—

Badger's Belt and Com, 1/2 doz \$2.00

Campbell Cutlery Co., Net prices

Electric Cutlery Co., Net prices

Genuine Emerson, 60% 50% 5%

Imitation, 1/2 doz \$2.00, 20% 10% 5%

Jordan's Pat. Padded, list Nov. 1, '89, 50%

Lamont Combination, 1/2 doz \$4.00

Torrey's, Net prices

Stuffer Sausage—

Miles' Challenge, 1/2 doz \$20, 50% 50% 5%

Perry, 1/2 doz, No. 1, \$15.00; No. 0, \$21.00, 50% 50% 10%

Draw Cut No. 4, each \$30.00, 20%

Enterprise Mfg. Co., list Jan 17, '93, 25%

Silver's, 40% 10%

Sweepers, Carpet and Lawn—

Acme, 1/2 doz \$26.00

Advance, 1/2 doz \$18.00

Banner Jap'd, 1/2 doz \$22.00; Nickel, \$24.00

Bissell No. 6, 1/2 doz \$17.00

Bissell No. 8, 1/2 doz \$20.00

Bissell, Grand, 1/2 doz \$36.00

Crown Jewel, No. 1, \$18.00; No. 2, \$19.00; No. 3, \$22.00

Domestic, 1/2 doz \$21.00

Domestic, No. 2, 1/2 doz \$22.00

Easy Jap'd, 1/2 doz \$22.00; Nickel, \$24.00

Excelsior, 1/2 doz \$22.00

Garland, 1/2 doz \$18.00

Gilt Edge, 1/2 doz \$24.00

Grand Rapids, 1/2 doz \$24.00

Grand Republic, 1/2 doz \$24.00

Jap'd, 1/2 doz \$30.00; Nickel, \$33.00

Housewife's Delight, 1/2 doz \$15.00

Imperial, 1/2 doz \$28.00

Improved Parlor Queen, 1/2 doz \$24.00

Japanned, 1/2 doz \$27.00

Ladies' Friend, 1/2 doz \$15.00

Ladies' Friend No. 2, 1/2 doz \$16.00

Magic, 1/2 doz \$15.00

Model, 1/2 doz \$27.00

Parlor Queen, 1/2 doz \$24.00

Our Leader, 1/2 doz \$19.00

Our Own, 1/2 doz \$27.00

Rapid Jap'd, 1/2 doz \$22.00; Nickel, \$24.00

Reliable, 1/2 doz \$22.00

Standard, 1/2 doz \$24.00

Supreme, 1/2 doz \$22.00

The Star, 1/2 doz \$21.00

Triumph, 1/2 doz \$20.00

Goshen Sweeper Company, Grand Rapids, Mich., make the following rebates

5 dozen in 6 months, 1/2 doz \$1.00

10 dozen in 6 months, 1/2 doz \$2.00

Except on L.P., when 10 dozen price is \$18.50, and 25 dozen \$18.00.

Lawn—

Thompson Mfg. Co., 30%

Swings—

Davies Lawn, 25%

Tacks, Brads &c.

List October 19, 1889. Old established

straight weights. Short weight goods

are sold at lower prices.

Carpet Tacks—

American, Blue, 1/2 doz \$65

American, Tin'd and Cop'd, 1/2 doz \$65

Steel, Bright and Blue, 1/2 doz \$65

Steel, Tinned and Coppered, 1/2 doz \$65

Swedes Iron, S. S., Blue, 1/2 doz \$65

Swedes Iron, S. S., Tinned, 1/2 doz \$65

American Iron Tacks, Domestic, 55%

American Iron Tacks, Foreign, 50%

Swedes Iron Tacks—

S. S., Blue, 1/2 doz \$55

S. S., Tinned, 1/2 doz \$60

Lanc., Blue, 1/2 doz \$50

Lanc., Tinned, 1/2 doz \$55

Upholsterers', S. S., 1/2 doz \$60

Upholsterers', Lanc., 1/2 doz \$50

Gimp Tacks—

S. S., Blue, 1/2 doz \$55

S. S., Tinned, 1/2 doz \$60

Lanc., Blue, 1/2 doz \$50

Lanc., Tinned, 1/2 doz \$55

Upholsterers', S. S., 1/2 doz \$60

Upholsterers', Lanc., 1/2 doz \$50

Basket and Trimmers' Tacks—

Lanc., 1/2 doz \$45

S. S., 1/2 doz \$50

Hungarian Nails, 1/2 doz \$50

Common and Patent Brads, 1/2 doz \$50

Leathered Tacks, 1/2 doz \$50

Brush Tacks and Nails, S. S., 1/2 doz \$50

Looking Glass Tacks, S. S., 1/2 doz \$50

Picture-Frame Points, S. S., 1/2 doz \$50

Lace Tacks, Blue, 1/2 doz \$45

Lace Tacks, Tinned, 1/2 doz \$50

Finishing Nails, 1/2 doz \$55

Trunk and Clout Nails—

Whips

Whips	Length.	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
American Whip Co.									
X. L. Whalebone Driving	\$15.00	20.00	22.00	24.00	27.00	30.00	33.00	36.00
Eureka, Two-thirds Whalebone	15.00	16.50	18.00	20.00				
Bull Bone, Half-length Whalebone								
American Standard	8.00	8.50	9.00	10.00	11.00	12.00	13.00	15.00
True Grip, Raw Hide Center	6.00	6.00	6.50	7.00	7.50	8.00	8.50	9.00
New Name, Stocked Java, Black and Wine Colors								
American, 98 Pen Whip								
Gentle Light Driving No. 111								
Gentle Light Driving No. 106								
Hand-made Stocked Java No. 108								
A large variety of cheaper grades								
Team Whips								
Toy Whips								
Hardware Assortment, 10/American, 75 Whips for \$50.00								

Wire and Wire Goods—

Iron—

Market,	Br. & Ann.	Extra 50/100
Br. & Ann. Nos. 0 to 18	often given and low net prices often made on large lots.
Cop'd, Nos. 0 to 18	
Galv'd, Nos. 0 to 18	
Tin'd, Tin'd list, Nos. 0 to 18	

Stone,	Br. and Ann'd,	Extra 10%
Nos. 16 to 18	often given.
Nos. 19 to 26	
Nos. 27 to 36	
Annealed Wire on Spools	
Brass, list Jan. 18, 1894	
Cast Steel Wire	
Copper, list Jan. 18, 1894	
Galvanized Fence	
Mallin's An'led & Tin'd on Spools	
Mallin's Brass and Cop. on Spools	

Steel Music Wire, 12 to 30, imported.
 Stubs' Steel Wire.....
 Tate's Spooled, Tin'd & Annealed.....
 Tate's Spooled Cop. and Brass.....
 Tinned Broom Wire, 12 to 21, # B.....
 Wire Clothes Line, see Lines.
 Wire Picture Cord, see Cord.

Bright Wire Goods—

Standard list.....
 Wire Cloth and Netting—
 Galvanized Wire Netting.....

Painted Screen Cloth 100 ft \$1.40 @ \$1.45
 Wire Barb—
 See Trade Report.

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable	40%
Baxter's Adjustable "8"	40% @ 50%
Baxter's Diagonal	60%
Coe's Genuine	50% @ 60%
Coe's Mechanics	50% @ 60%
Girard Standard	50% @ 60%
Girard Mineral, German	50% @ 60%
Lamson & Sessions' Standard	70% @ 10%
Lamson & Sessions' Agric'l	75% @ 5%
P. S. & W. Agricultural	80% @ 5%
W. & B. Diamond	80% @ 5%

Acme, Bright	50%
Acme, Nickled	40%
Alken's Pocket (Bright)	50%
Aligator	50%
Always Ready	25%
Benn's & Call's	35%
Adjustable S.	35%
Walker's Pattern	30%
Combination Black	40%
Combination Bright	40%
Cylinder or Gas Pipe	45%
Extra Heavy	45%
Merrick's Pattern	45%
No. 3 Pipe Bright	55%
Boardman's	25%
Cincinnati Brace Wrenches	25%
Diamond Steel	55%
Donohue's Engineer	20%
Eagle	50%
Hercules	70%
Taff's Vise Wrench	55%
The Favorite Pocket	40%
Walker's	55%
Webster's Pat. Combination	35%

Wringers, Clothes—
 Am. Wringer Co., list July 1, 1893, 2% cash
 Colby Wringer Co., list Sept. 1, '91, 2% cash
 Lovell Mfg. Co., list July 1, 1892, 2% cash
 Peerless Mfg. Co., list Feb. 1, 1892, 2% cash
 National Wringer & Mfg. Co., list June 1, 1892, 2% cash

Wrought Goods—
 Staples, Hooks, &c., list, March 17, 1892, 85% @ 85% & 11%

Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable Oils—

Linseed, City, raw, per gal.	52	@	..
Linseed, City, boiled	55	@	..
Linseed, Western, raw	50	@	..
Lard, City, Extra Winter	63	@	..
Lard, City Prime	62	@	..
Lard, City, Extra No. 1	50	@	50
Lard, City, No. 1	45	@	45
Lard, Western, prime	27	@	12
Cotton-seed, Crude, prime	27	@	23
Cotton-seed, Crude, off grades	25	@	28
Cotton-seed, Summer Yellow, prime	32	@	33
Cotton-seed, Summer Yellow, off grades	31	@	31
Sperm, Crude	63	@	63
Sperm, Natural Spring	68	@	68
Sperm, Bleached Spring	68	@	70
Sperm, Natural Winter	68	@	70
Sperm, Bleached Winter	73	@	75
Whale, Crude	44	@	..
Whale, Natural Winter	44	@	..
Whale, Bleached Winter	47	@	..
Whale, Extra Bleached	47	@	..
Sea Elephant, Bleached	32	@	33
Menhaden, Crude, Sound	32	@	33
Menhaden, Crude, Southern	32	@	33
Menhaden, Light Pressed	32	@	33
Menhaden, Bleached Water	32	@	33
Menhaden, Extra Bleached	32	@	33
Tallow, City, prime	50	@	52
Tallow, Western, prime	48	@	50
Cocconut, Ceylon	54%	@	54%
Cocconut, Cochiti	61%	@	61%
Cod, Domestic	38	@	40
Cod, Foreign	40	@	43
Red Elaine	35	@	38
Red Saponified	44%	@	44%
Bank Straits	35	@	38
Olive, Italian, bbls	58	@	62
Neatsfoot, prime	60	@	65
Palm, prime, Lagos	54%	@	54%

Black, 29 gravity, summer	54%	@	54%
Cylinder, dark, filtered	12	@	16
Paraffine, 23 1/2 @ 24 gravity	11	@	12
Paraffine, 25 gravity	10	@	11
Paraffine, 28 gravity	7 1/2	@	8
Paraffine, red	9 1/2	@	10 1/2

Paints and Colors—

Barytes, Foreign, 1 ton	\$22.00	@	24.00
Barytes, Amer. floated	22.00	@	23.00
Barytes, Amer. No. 1	16.00	@	18.00
Barytes, Amer. No. 2	13.00	@	15.00
Barytes, Amer. No. 3	11.00	@	12.00
Blue, Celestial	40	@	50
Blue, Chinese	25	@	40
Blue, Prussian	8	@	25
Blue, Ultramarine	3 1/2	@	1
Brown, Spanish	3	@	3 1/2
Brown, Vandyke, Amer.	6	@	8
Brown, Vandyke, English	2.75	@	..
Carmine, No. 40, in bulk	2.85	@	..
Carmine, No. 40, in ounce bottles	3.75	@	..
Chalk, in bulk	1.75	@	2.00
Chalk, in bbls. # 100	33	@	40
China Clay, English	13.00	@	18.00
Cobalt Oxide, prep'd	9.00	@	11.00
Cobalt Oxide, black	1.90	@	..
Cobalt Oxide, black, less 100 lb.	1.98	@	..
Green, Paris, in bulk	10	@	10 1/2
Green, Paris, 170 @ 175 lb	10 1/2	@	11
Green, Paris, small pack	12	@	17
Green, Chrome, ordinary	6	@	12
Green, Chrome, pure	22	@	25
Lead, Eng., B.B. white	7	@	8
Lead, Amn. White	4 1/2	@	4 1/2
Lead, White, in oil 25 lb tin	5 1/2	@	6 1/2
Lead, White, in oil 12 1/2 lb tin	..	@	1 1/2
Lead, White, in oil 1 to 5 lb assorted tins, add to kg price	..	@	1
Lead, Red, bbls. and 1/2 bbls.	5 1/2	@	6 1/2
Lead, Red, kegs	6 1/2	@	6

Litharge, kegs	5 1/2	@	5 1/2
Ocher, Rochelle	1.35	@	1 1/2
Ocher, French Washed	1 1/2	@	2 1/2
Ocher, German Washed	1 1/2	@	3
Ocher, American	1 1/2	@	1 1/2
Orange Mineral, English	7 1/2	@	8
Orange Mineral, French	10	@	10 1/2
Orange Mineral, German	7 1/2	@	8
Orange Mineral, American	7 1/2	@	8
Red, Indian, English	5	@	15
Red, Indian, American	2	@	5
Red, Turkey	9	@	14
Red, Tuscan	7	@	10
Red, Venetian, American	70	@	1.00
Red, Venetian, English	1.10	@	1.35
Sienna, Italian, Burnt and Powder, # B	4	@	5
Sienna, Ital., Burnt Lumps	1 1/2	@	3 1/2
Sienna, Ital., Raw, Powder	4 1/2	@	5 1/2
Sienna, Ital., Raw, Lumps	1 1/2	@	3 1/2
Sienna, American, Raw	1 1/2	@	1 1/2
Sienna, American, Burnt and Powdered	1 1/2	@	1 1/2
Talc, French	1 1/2	@	1 1/2
Talc, American	1	@	1 1/2
Terra Alba, Fr'ch, # 100 lb	65	@	75
Terra Alba, English	65	@	75
Terra Alba, American No. 1	65	@	75
Terra Alba, American No. 2	45	@	50
Umber, Turkey, Burnt and Powdered	2 1/2	@	3 1/2
Umber, Turkey Bnt. Ln.	2 1/2	@	3
Umber, Turkey, Raw and Powdered	2 1/2	@	3 1/2
Umber, Turkey, Rnt. Amer.	1 1/2	@	2 1/2
Umber, Turkey, R'w Amer.	1 1/2	@	2 1/2
Yellow, Chrome	10	@	25
Vermilion, American Lead	11	@	12
Vermilion, Quicks'er, bulk	43	@	..
Vermilion, Quicks'er, bags	44	@	..
Vermilion, Quicksilver sm'r	52	@	..
Vermilion, English Import	55	@	60
Vermilion, Imitation, Eng.	8	@	30
Vermilion, Trieste	90	@	95
Vermilion, Chinese	85	@	1.00
Whiting Common, # 100 lb	40	@	45
Whiting Glucers	50	@	55
Zinc, American, dry	50	@	55
Zinc, French, Red Seal	7	@	7 1/2
Zinc, French, Green Seal	8 1/2	@	9

Zinc, French, V. M. X.	6	@	6 1/2
Zinc, Antwerp, Red Seal	6	@	6 1/2
Zinc, Antwerp, Green Seal	6	@	6 1/2
Zinc, German, L. Z. O.	5	@	5 1/2
Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over	10 1/2	@	..
Zinc, V. M. in Poppy Oil, lots less than one ton	11	@	..
Zinc, V. M. in Poppy Oil, Red Seal, lots of 1 ton and over	10 1/2	@	..
Zinc, V. M. in Poppy Oil, lots of less than 1 ton	10 1/2	@	..
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or assorted grades, 15 : 25 bbls. 2 % ; 50 bbls. 4 % . No discount allowed on less than bbl. lots.			

Colors in Oil—

Black, Drop, Frankfort	25	@	30
Black, Drop, English	12	@	15
Black, Drop, Domestic	7	@	10
Black, Lampblack, Best	20	@	35
Black, Lampblack, Common	7	@	13
Black, Ivory	35	@	40
Blue, Chinese	20	@	45
Blue, Prussian	12	@	18
Blue, Ultramarine	7	@	13
Brown, Vandyke	8	@	13
Green, Chrome	16	@	18 1/2
Green, Paris	7	@	14
Sienna, Raw	7	@	14
Sienna, Burnt	7	@	14
Umber, Raw	7	@	10
Umber, Burnt	7	@	10

Putty—

In barrels and 1/2 bbls.	0.13%	@	0.13%
In tubs	0.13%	@	0.13%
In tin cans	0.13%	@	0.13%
In splitters	0.13%	@	0.13%

Spirds Turpentine—

In regular bbls.	..	@	30
In machine bbls.	..	@	30 1/2

Glue—

Low Grade	7	@	9
Cabinet	11	@	14
Medium White	12	@	14
Extra White	16	@	20
French	10	@	17
English	10	@	17
Irish	10	@	12 1/2

THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

RATES OF SUBSCRIPTION: INCLUDING POSTAGE.

UNITED STATES AND BRITISH AMERICA.

Weekly Edition, Issued every THURSDAY MORNING	\$4.50 a year.
Semi-Monthly Edition, First and Third THURSDAYS of every month	1.30 "
Monthly Edition First THURSDAY of every month	1.15 "

ALL OTHER COUNTRIES.

Per Annum, Postpaid.

Weekly Edition : \$5.00 = £1.25 = francs = 20 marks = 11 florins = 6 roubles (coin) = 25 lire = 50 pesetas.	
Semi-Monthly Edition : \$2.50 = 10/ = 12 1/2 francs = 10 marks = 6 florins = 3 roubles (coin) = 12 1/2 lire = 10 pesetas.	
Monthly Edition : \$1.25 = 5/ = 6 1/4 francs = 5 marks = 3 florins = 1 1/2 roubles (coin) = 6 1/4 lire = 5 pesetas.	

RATES OF ADVERTISING: ONE SQUARE (12 LINES, ONE INCH).

ONE INSERTION	\$2.00
ONE MONTH,	7.50
THREE MONTHS,	17.50

SIX MONTHS,	\$30.00
ONE YEAR,	50.00

Rates for larger spaces quoted on application.

New York (Main Office),	96-102 Reade Street,	DAVID WILLIAMS, Publisher.
Philadelphia,	220 South Fourth Street,	THOMAS HOBSON, Manager.
Pittsburgh,	Room 509, Hamilton Building.	ROBERT A. WALKER, Manager.
Chicago,	59 Dearborn Street, cor. Randolph,	J. K. HANES, Business Manager.
Cincinnati,	Rooms 22-24 Pickering Building,	GEO. W. COPE, Resident Assc. Ed.
St. Louis,	Bank of Commerce Building,	HENRY SMITH, Manager.
Boston,	146 Franklin Street,	H. H. ROBERTS, Manager.
Cleveland,	312 The Cuyahoga,	WALTER C. ENGLISH, Manager.
		EZRA S. ADAMS, Manager.

BRITISH AGENCY: Office of The Ironmonger, 42 Cannon St., London.

AUSTRALIAN OFFICES: Melbourne, 231 Elizabeth St.; Sydney, 420 George St.

Remittances should be made by draft, payable to the order of DAVID WILLIAMS, on any banking house in the United States or Europe, or by P. O. Money Order on New York. When these cannot be obtained, postage stamps of any country will be received.

Newspapers or Bookellers in any part of the world may obtain The Iron Age through The American News Company, New York, U. S. A. The International News Company, New York, U. S. A. and London, England; or The San Francisco News Company, San Francisco, Cal. U. S. A.

Entered at the Post Office, New York as Second-Class Matter

CURRENT METAL PRICES.

APRIL 11, 1894.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Common Iron:	
1 to 2 in. round and square.	1 to 6 in. x 1/2 to 1 in. } \$ D 1.60 @ 1.70¢
Refined Iron:	
1 to 2 in. round and square.	1 to 6 in. x 1/2 to 1 in. } \$ D 1.70 @ 1.90¢
1 to 4 in. x 1/2 to 1 in.	
1 to 6 in. x 1/2 to 1 in.	
1 to 6 in. x 1/2 and 5-16.	\$ D 1.90 @ 2.00¢
Rods—1/2 and 1-16 round and sq.	\$ D 1.80 @ 1.90¢
Bands—1 to 6 x 3-16 to No. 12.	\$ D 2.00 @ 2.10¢
"Burden Best" Iron, base price.	\$ D 2.80¢
Burden's "H. B. & S." Iron,	
base price.	\$ D 2.67¢
"Ulster"	\$ D 2.80¢
Norway Bars	3.50 @ 3.75¢
Norway Shapes	4.00 @ 4.50¢

Merchant Steel from Store—

Open-Heart and Bessemer Machinery,	
Toe Calk, Tire and Sleigh Shoe, base	
price in small lots	2 ¢
Best Cast Steel, base price in small lots.	7 1/2 ¢
Best Cast Steel Machinery, base price in	
small lots	4 1/2 ¢

Sheet Iron from Store—

Black—

Best Refined Iron.

Nos. 14 to 20.	2.90
21 to 24.	3.00
25 to 26.	3.10
27.	3.20
28.	3.40

Common 1/4 less than the above.

Open Hearth Steel.

Best Soft Steel, Nos. 14 to 16.	2 1/2 ¢ @ 2 3/4 ¢
" " " 18 to 20.	2 3/4 ¢ @ 3 ¢
" " " 21 to 24.	3 ¢ @ 3 1/4 ¢
" " " 25 to 26.	3 1/4 ¢ @ 3 3/4 ¢
" " " 27 to 28.	3 3/4 ¢ @ 3 1/2 ¢

Best Bloom Sheets, 1/4 extra over above prices.

Best Bloom, Galvanized, jobbing dis. 70 @ 70 1/2 %

Ordinary Bessemer, 1/4 ¢ @ 1/4 ¢ lower than above prices.

Russia, Planished, &c.

Genuine Russia, according to	
assortment	\$ D 11 1/4 ¢ @ 12 ¢
Patent Planished	\$ D A, 10 ¢; B, 9 ¢; 5 ¢
Craig Polished Sheet Steel	\$ D 8 1/2 ¢

Foreign Steel from Store—

Best Cast	\$ D 15 ¢
Extra Cast	\$ D 16 ¢
Swaged, Cast	\$ D 16 ¢
Best Double Shear	\$ D 15 ¢
Blister, 1st quality	\$ D 12 ¢
German Steel, Best	\$ D 10 ¢
2d quality	\$ D 9 ¢
8d quality	\$ D 8 ¢
Sheet Cast Steel, 1st quality	\$ D 15 ¢
2d quality	\$ D 14 ¢
8d quality	\$ D 12 1/2 ¢
R. Mushet's "Special"	\$ D 48 ¢
" " " Annealed	\$ D 75 ¢
" " " "Titanic"	\$ D 30 ¢
Micken's Special No. 8	\$ D 30 ¢
Extra	\$ D 15 ¢

METALS—

Tin—

Banca, Pigs	21 1/2 ¢ @ 21 1/2 ¢
Straits, Pigs	20 1/2 ¢ @ 21 ¢
Straits in Bars	22 ¢ @ 22 1/2 ¢

Tin Plates—

Duty: 2 1/2 ¢ @ 2 ¢.

Charcoal Plates—Bright—

Guaranteed Plates command special	
prices, according to quality.	
Melvin and Calland Grade, IC, 10	x 14. @ \$6.50
" " " " " " " " " " " "	12 x 12. @ 6.75
" " " " " " " " " " " "	10 x 14. @ 6.50
" " " " " " " " " " " "	10 x 20. @ 13.00
" " " " " " " " " " " "	12 x 12. @ 8.50
" " " " " " " " " " " "	12 x 12. @ 8.75
" " " " " " " " " " " "	12 x 14. @ 8.50
" " " " " " " " " " " "	12 x 20. @ 17.00
" " " " " " " " " " " "	DC, 12 1/2 x 17. @ 6.00
" " " " " " " " " " " "	DC, 12 1/2 x 17. @ 8.00
Allaway Grade	10 x 14. @ 6.00
" " " " " " " " " " " "	10 x 12. @ 6.25
" " " " " " " " " " " "	10 x 14. @ 6.00
" " " " " " " " " " " "	10 x 20. @ 12.00
" " " " " " " " " " " "	12 x 12. @ 7.25
" " " " " " " " " " " "	12 x 12. @ 7.50
" " " " " " " " " " " "	12 x 14. @ 7.25
" " " " " " " " " " " "	12 x 20. @ 14.50
" " " " " " " " " " " "	DC, 12 1/2 x 17. @ 5.50
" " " " " " " " " " " "	DC, 12 1/2 x 17. @ 6.75

Coke Plates—Bright—

eel Coke.—IC, 10 x 14, 14 x 20.	\$5.40 @ \$5.50
" " " " " " " " " " " "	10 x 20. @ 8.25
" " " " " " " " " " " "	20 x 28. 11.50 @ 6.75
BV Grade.—IC, 10 x 14, 14 x 20.	@ 5.50

Charcoal Plates—Terne—

Guaranteed Plates command special	
prices, according to quality.	
Dean Grade.—IC, 10 x 14, 14 x 20.	@ \$5.85
" " " " " " " " " " " "	20 x 28. @ 11.00
" " " " " " " " " " " "	IX, 14 x 20. @ 6.40
" " " " " " " " " " " "	20 x 28. @ 12.80
Abesearne Grade.—IC, 14 x 20.	@ 5.50
" " " " " " " " " " " "	20 x 28. @ 10.75
" " " " " " " " " " " "	IX, 14 x 20. @ 6.40
" " " " " " " " " " " "	20 x 28. @ 12.80

Tin Boiler Plates—

XXX, 14 x 28.	112 sheets @ \$13.25
XX, 14 x 28.	112 sheets @ 14.50
IX, 14 x 31.	112 sheets @ 16.00

American Terne Plates.—Apollo.

IC, 14 x 28.	@ \$5.25
IX, 14 x 28.	@ 12.50
IX, 14 x 28.	@ 7.25
IX, 20 x 28.	@ 14.50

Copper—
Duty: Pig, Bar and Ingot, 1 1/4 ¢; Old Copper, 1 ¢.
Manufactured (including all articles of which Copper is a component of chief value), 35 ¢ ad valorem.

Ingot—

Lake	@ 11 ¢
Ansonia grade Arizona	@ 10 1/4 ¢
Ansonia grade Casting	@ 10 ¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, March 22, 1894. Stubs' gauge standard.

Not wider than	Not longer than	And longer than	Weights per sq. foot and prices per pound.									
			Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.		
30	72		14	14	14	15	16	17	20	22		
30		72	14	14	14	15	17	19	23			
30			14	14	14	16	18	22	25			
38	96		14	14	15	17	19	23	27			
48	96		14	14	16	18	20	24				
48		96	14	14	17	19	21	25				
60	96		14	14	19	21	26					
60		96	14	15	20							
84	96		15	16								
84		96	16	17								
Over 84 in. wide			17	19								

Bolt Copper, 1/2 inch diameter and over, \$ D 14
Circles, Segments and Pattern Sheets, 60 in
diameter and less, 2 1/4 ¢ advance over prices
of Sheet Copper required to cut them from.
Circles, Segments and Pattern Sheets, over 60
in. diameter, up to 96 in. diameter inclusive,
4 ¢ advance over prices of Sheet Copper
required to cut them from.
Circles, Segments and Pattern Sheets, over 96
in. diameter, 5 ¢ advance over prices of
Sheet Copper required to cut them from.
Cold or Hard Rolled Copper, 1/4 oz. square foot
and heavier, 1 1/4 ¢ over the foregoing prices.
Cold or Hard Rolled Copper lighter than 1/4 oz.
square foot, 2 ¢ over the foregoing prices.
All Polished Copper over 20 in. wide, 2 1/4 ¢
advance over the foregoing prices.

Copper Bottoms, Pits and Flats—

14 ounce to square foot and heavier. 18 ¢
12 ounce and up to 14 ounce to square foot. 18 ¢
10 ounce and up to 12 ounce. 21 ¢
Lighter than 10 ounces. 2 1/2 ¢
Circles less than 8 inches diameter, 2 ¢ advance
over the foregoing prices.
Circles over 13 inches diameter are not classed
as Copper Bottoms.

Copper Wash Bowl Bottoms—

Tinned

Tinning—

Tinning sheets on one side, 10, 12 and 14 x 48
each

Planished Brass and Copper—

Not larger than 80 x 60.
16 oz. and heavier. 24 ¢ @ 25 ¢
14 oz. 25 ¢ @ 26 ¢
12 oz. 27 ¢ @ 28 ¢

Seamless Brass Tubes—

Standard always Stubs' gauge, unless other-
wise ordered.
July 6, 1892. Net.

O. G.	N. G.	%	%	%	%	%	%	%	%
8-14	6-12	32	28	25	24	23	22	19	
15	13	33	28	26	25	24	23	20	
16	14	34	29	27	26	25	24	20	
17	15	35	30	28	27	26	25	21	
18	16	37	31	29	27	26	25	22	
19	17	38	32	30	29	28	27	24	
20	18-19	39	34	32	31	30	29	26	
21	20	41	36	34	33	32	31	29	
22	21	43	37	35	34	33	32	31	
23	22	45	39	37	36	35	34	34	
24	23	48	41	39	38	36	35	36	
25	24	51	44	41	40	39	38	40	

Copper, Bronze and Gilding Tube, 3/4 ¢ additional

Brass Tubing. (To No. 20 inclusive.)

Brown & Sharpe's gauge standard.

Above 5-16 inch to 3 inch, inclusive. 35 ¢
Plain, above 3 inch. 45 ¢
Plain, 5-16 inch. 45 ¢
Plain, 1/4 inch. 60 ¢
Plain, 3-16 inch. \$1.00
Fancy Tubing, Brass, to No. 20, inclusive. \$1.50
Bronze Tubing, 3/4 ¢ more than Brass.
Discount from list. 30 ¢ @ .5 ¢

Roll and Sheet Brass—

(Brown & Sharpe Standard Gauge.)

Common High Brass:	In.	In.	In.	In.	In.	In.	In.	In.	In.
Wider than	2	10	12	14	16	18	20	22	24
and including									

To No. 20 -inclusive ..	21	22	23	25	27	29	31	33	
Nos. 21, 22, 23 and 24.	32	33	34	36	38	40	42	44	
Nos. 25 and 26.	35	36	37	39	41	43	45	47	
Nos. 27 and 28.	38	39	40	42	44	46	48	50	

Common High Brass:	In.	In.	In.	In.	In.	In.	In.	In.	In.
Wider than	24	26	28	30	32	34	36	38	40
and including									

To No. 20, inclusive. 36 ¢
Nos. 21, 22, 23 and 24. 37 ¢
Nos. 25 and 26. 38 ¢
Nos. 27 and 28. 39 ¢

Discount from List 25 ¢ @ 35 ¢.

Brass and Copper Wire—

List January 17, 1894.

"Numbered by Stubs' gauge.	Soft & hard high brass.	Spring high brass.	Low brass.	Cop- per.
All Nos. to No. 16, inclu- sive.	\$0.22	\$0.24	\$0.26	\$0.30
No. 17 and No. 18 .....	.23	.25	.27	.31
No. 19 and No. 20 .....	.24	.26	.28	.32
No. 21, or 0.032 diameter	.25	.27	.29	.33

Discount 25 ¢ @ 35 ¢.

Fine Numbers.

Numbered by London gauge.	Brass.	Spring high brass.	Low brass.	Cop- per.
No. 22.	\$0.23	\$0.25	\$0.27	\$0.34
No. 23. ....	.23	.25	.27	.36
No. 24. ....	.30	.32	.34	.38
No. 25. ....	.32	.34	.36	.40
No. 26. ....	.35	.37	.39	.43
No. 27. ....	.38	.40	.42	.46
No. 28. ....	.42	.44	.46	.51
No. 29. ....	.45	.47	.49	.54
No. 30. ....	.48	.50	.52	.57
No. 31. ....	.51	.53	.55	.61
No. 32. ....	.55	.57	.59	.67
No. 33. ....	.59	.61	.63	.73
No. 34. ....	.64	.66	.68	.82
No. 35. ....	.70	.72	.74	.95
No. 36. ....	.73	.75	.77	1.00
No. 37.	1.00	1.02	1.04	1.70
No. 38.	1.30	1.32	1.34	2.00
No. 39.	2.00	2.02	2.04	3.25
No. 40.	2.60	2.62	2.64	5.75

— discount.

Copper Belt and Hose Rivets and

Burrs—

No. 5.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.
Per D.	Per D.	Per D.	Per D.	Per D.	Per D.
49 ¢	49 ¢	49 ¢	49 ¢	49 ¢	49 ¢
50 ¢	50 ¢	50 ¢	50 ¢	50 ¢	50 ¢
51 ¢	51 ¢	51 ¢	51 ¢	51 ¢	51 ¢
52 ¢	52 ¢	52 ¢	52 ¢	52 ¢	52 ¢
53 ¢	53 ¢	53 ¢	53 ¢	53 ¢	53 ¢
54 ¢	54 ¢	54 ¢	54 ¢	54 ¢	54 ¢

60 ¢ @ 5 ¢ discount.

Tobin Bronze—Rods.

Drawn Rods for Bolts, Forgings, &c.

1/2 to 3/4 inches inclusive. 17 ¢ @ 18 ¢
Over 3/4 to 5 inches inclusive. 18 ¢ @ 19 ¢
Flat on Rods, Finished True, Smooth and Straight.
1/2 to 3/4 inches inclusive. 18 ¢ @ 19 ¢
Over 3/4 to 5 inches inclusive. 19 ¢ @ 20 ¢

Duty: Pig, Bars and Plates, \$1

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

GoogleTM books

<https://books.google.com>

